c.3661.

8.2.e.

Bibliotheca Anatomica, Medica, Chirurgica, &c.

CONTAINING A

DESCRIPTION

OF

The ſeveral Parts

OF THE

BODY:

Each done by ſome One or more Eminent PHYSICIAN or CHIRURGEON; with their DISEASES and CURES.

Wherein are not only all the Tracts of Uſe that are in the Second Edition of the *Bibliotheca Anatomica*, lately publiſh'd by *Daniel Clericus* and *Jacob Magnetus*, in Two Volumes in Folio, but an Addition alſo of near double the Number of other Curious Tracts, which were either omitted in the ſaid *Bibliotheca*, or have been publiſh'd ſince, ſome of them *tranſlated*, others *faithfully abridg'd*; very few of which were ever before in *Engliſh*.

Illuſtrated with ſeveral Hundred FIGURES, done by the beſt Artiſts, and from the trueſt Deſigns; as will appear from the Name to each Figure.

VOL. The Third and Laſt.

Contains 12 *Months, and finiſhes whatever relates to the* Blood, Fluids, *Motion of the* Heart, Chilification, Circulation, *of* Poiſons; *of the* Diſeaſes *and* Cures *in the Genital Parts of* Men *and* Women, &c. *With ſeveral remarkable Caſes communicated from* Engliſh *Surgeons*, &c. *as well as from Mr.* Bidloe; *Alſo the Surgeons* Pharmacopeia *done into* Engliſh; *From Mr.* Bolneſt, *Surgeon to the* French King's *Hoſpitals. This* 3*d Volume Collected and Extracted from* 66 *ſeveral ſcarce Tracts; as appears by the Contents, not in* Engliſh *before; from which, and other the beſt Anatomical Authors, are taken the moſt accurate Figures anſwerable to the Deſign.*

With an exact *Index* to the whole three Volumes.

In the *SAVOY*:

Printed by *John Nutt*; and Sold by *W. Lewis* in *Ruſſel-ſtreet*, *Covent-Garden*; *Dan. Browne* without *Temple-Bar*; *J. Pemberton* in *Fleet-ſtreet*; *R. Knaplock* at the *Biſhop's Head*, *R. Wilkin* at the *King's Head*, and *M. Atkins* at the *Golden-Ball*, in St. *Paul's* Church-yard; *W. Taylor* at the *Ship* in *Pater-Noſter-Row*; *T. Horne* under the *Royal-Exchange*, *A. Bell* at the *Croſs-Keys*, in *Cornhill*; and *J. Morphew* near *Stationers-Hall*. 1714. Where may be had the Firſt and Second Volumes compleat; or any odd Months to perfect their Sets. (Price 1 *s.* each.)

MVSEVM
BRITAN
NICVM

Advertiſement of the three Volumes of the Bibliotheca Anatomica, Medica, Chirurgica, *&c.*

VOL. I.

CONTAINS 14 Months, and finiſhes whatever relates to the Bones, with their Diſeaſes and Cures, containing above 60 ſeveral Tracts, and many large Copper Plates, in which are above 300 Figures.

VOL. II.

Contains 13 Months, and finiſhes what relates to the *Muſcles*, *Veins*, *Arteries*, *Nerves*, *&c.* with the three Venters, *viz.* The *Head*, *Breaſt*, and *Belly*; the Diſeaſes belonging to them, and the Parts contain'd therein, with their Cures; Collected and Extracted from ſeveral ſcarce Tracts, not in *Engliſh* before; From which, and other the beſt Anatomical Authors, are taken the moſt acute Figures that are anſwerable to the Deſign.

VOL. III.

Contains 13 Months, and finiſhes whatever relates to the *Blood*, *Fluids*, Motion of the *Heart*, *Chilification*, *Circulation*, of *Poiſons*; of the *Diſeaſes* and *Cures* in the Genital Parts of *Men* and *Women*: With ſeveral remarkable Caſes communicated from *Engliſh* Surgeons, &c. as well as from Mr. *Bidloe*; Alſo the Surgeons *Pharmacopeia* done into *Engliſh*. From Mr. *Bolneſt*, Surgeon to the *French King's* Hoſpitals. Collected and Extracted from ſeveral ſcarce Tracts: In Number 66, as appears by the Contents, not in *Engliſh* before; from which, and other the beſt Anatomical Authors, are taken the moſt accurate Figures that are anſwerable to the Deſign.

THE PREFACE TO THE READER.

WE gave a large Account before the Firſt Volume of this Work, and of the Deſign thereof; ſo ſhall be very ſhort now, and only acquaint the Reader:

Firſt, We have made uſe of the beſt Authors, and none other in any Language.

Secondly, They were tranſlated or abſtracted by ſeveral Hands; which, we hope, are done with Care and Exactneſs, as the Reader will find.

Thirdly, The Cuts are done from the beſt Authors and Deſigns that could be procur'd, and by the moſt exact Engravers in this Way; and in all, contain about Fifty very large Copper Plates, in which every Part is exactly deſcribed; and ſeveral Diſeaſes and Cures thereon.

Fourthly, This contains Five Times more, as may be ſeen by the Number of Tracts, than the great *Bibliotheca Anatomica*

tomica in Two large Volumes in *Folio*; and more modern and uſeful, as may be ſeen in the Contents to each Volume:

The Firſt Volume containing above	60	Tracts;
The Second Volume above — —	90	
And the Third and laſt Volume —	66	different Tracts.
In all — — — — — —	216	

Not to be procured for Ten Times the Money theſe are ſold for.

Fifthly, To this Third and laſt Volume is added a large *Index* to the whole, all put in one Alphabetical Order; ſo that the Phyſician, Surgeon, *&c.* may find many Caſes on one and the ſame Part, with the Diſeaſes and Cures done by different Perſons, for his better Information.

Sixthly, The Perſons concern'd have ſpared no Coſt in having the Whole well done; the Ingraving, the Cuts, the Copy-Money, Books from abroad, that were uſed in compiling the ſame from different Languages, never before in *Engliſh*, amounting to above Five hundred Pounds, beſides the Paper and Print of the Whole. And,

Seventhly and laſtly, We may be bold to ſay, It is the beſt and moſt perfect Collection in this Nature, and much the cheapeſt that ever was yet done in any Country or Language whatever.

And ſo READER *Farewel.*

The

The CONTENTS of the Tracts contain'd in this Third and last Volume of the *Bibliotheca Anatomica, &c.*

Tract 1. *OF the Motion of the Blood; and first of Sanguification, and Nutrition. From* Harvey, Gliſſon, Lower, Wallæus, Verheyen, Drake, *&c.* Page 1

2. *Of the Nature of Fluidity; how Fluids agree, and that Blood is like other Fluids; with an Account of what is known of that Liquor. From* Paxton's *Specimen,* Phyſico-Medicum, &c. 12

3. *Of the Blood, with ſeveral Experiments made thereon by Boiling; the Addition of ſeveral mix'd Bodies by the Microſcope and Chimical* Analyſis. *From* Phil. Verheyen, *&c.* 19

4. *Of the Motion of the Heart, and Circulation of the Blood. From* Harvey, Lower, Wallæus, De Back, Ent, Bartholin, Baglivy, Verheyen, St. Hillaire, *&c.* 25

5. *Of the Motion of the Blood, Sanguification, and Nutrition,* &c. *From* James De Back, *Phyſician in Ordinary to the Town of* Rotterdam. 35

6. *Whether* Harvey *thought that the Ventricles of the Heart were ſo expanded in the* Syſtole, *that they might receive Blood, and ſo ſhut up again in the* Diaſtole *as to thruſt it forth; that ſuch a Sequel did follow from the Suppoſitions of* Carteſius. *By* J. De Back. 40

7. *Of the Action of the Heart, and the Motion of the Blood, called Circulation; with ſeveral material Things that depend thereon. From* Diemerbroeck, Willis, Etmuller, Duncan, St. Hillaire, *&c.* 44

8. *Of Chylification, and its Paſſage into the Blood; with ſome Account of its Motion, together with Nutrition and Accretion. From* Phil. Verheyen, M. D. *Profeſſor of Anatomy at* Lovaine. 57

Tract 9. *Of the Expulſion of the Chile from the Stomach, and its Paſſage to the Blood. By the ſame.* Page 61

10. *Of the Circulation of the Blood. By the ſame* 62

11. *Of Fermentation in general, in order to the better underſtanding of Animal Fermentations, and the Motion of Animal Fluids. From the* Philoſophical Tranſactions, *and* Des Cartes, *Eſquire* Boyle, *Dr.* Willis, *Dr.* Drake, *&c.* 67

12. *Dr.* John Mayow's *Treatiſe of the Motion of the Animal Spirits; to which ſome Things are added concerning the Motion of the Brain, &c.* 82

13. *Of Digeſtion, Chilification, and the* Apparatus *thereto conducing. From* Gliſſon, Willis, Havers, Drake, *&c.* 107

14. *In what Manner the Contraction of the Fibrils of the Heart is performed, as alſo of the Contractive Motion of the Muſcles in geral. From* Mayow, *&c.* 120

15. *Of Voluntary Motion, according to the Syſtem of* Borellus, Willis Gliſſon, Harvey, *and others taken from Dr.* Charleton's *Enquiry into Human Nature,* &c. 131

16. *Of Nutrition, and what elſe relates to it agreeable to the Opinions of* Harvey, Gliſſon, Malpighius, Willis, *Dr.* Ent's Antidiatritriba, &c. 140

17. *Of the Nature of different Fluids, and particularly of the Spirits called Animal or Nervous, and their Motion. From Dr.* Paxton's Specimen Phyſ. Med. 157

18. *Rules for the Practice of Phyſick. Tranſlated from Sir* David Hamilton, *Phyſician in Ordinary to her preſent Majeſty Queen* Anne, 165

Tract 19. *An Account of Animal Secretion, the Quantity of Blood in the Humane Body, and Muſcular Motion. By* J. Keill, M. D. Page 177

20. Myographiæ Comparatæ Specimen: *Or, a Comparative Deſcription of all the Muſcles in a Man, and a Quadruped; ſhewing their Diſcoverer, Origine, Progreſs, Inſertion, Uſe, and Difference: To which is added, an Account of the Muſcles particular to a Woman. By* J. Douglas, M. D. 199

21. Adverſaria Anatom. Med. Chirurgica, *taken from ſome ſcattered Pieces of Dr.* Fredererick Ruyſch, *Mr.* John Jacob Raw, *Mr.* Guevelon, *the two* Adrians, *Father and Son, Mr.* Catuve, *&c.* 204

22. *Of the Manner and Laws of Secretion, the true Structure of the Glands, and of the Operation of Vomitive, Purgative, and Mercurial Medicines, which are mechanically explain'd by Dr.* Chene. 217

23. *An entire Hiſtory of all the Fluids that are contained in the Humane Body, as Chyle, Milk, the* Semen Virile, *Pancreatick and Biliary Juices, the* Lochia, *and other Female Excretions,* Serum Lympha, *the Humour of the* Pericardium, Salva, *Tears or the Liquor flowing from the Eyes, the* Mucus *or Snot of the Noſe, Ear-Wax, Urine, Sweat, the Matter of inſenſible Tranſpiration; of Spirits called* Animal, Succus Nutritius, &c. *From* Verheyen, Bellini, D'Gagnon, Hecquet, *and other Modern Authors: And firſt from* Pitcarn's *Diſſertations.* 142

24 *Of the Circulation of the Blood by the ſmaller Veſſels. By* Dr. Pitcarn. 142

25. *Of the ſeveral Effects of Poiſons on Humane Bodies, with a Mechanical Account of Poiſons, from Drs.* Mead, Brown, Baglivy, *&c.* 258

26. *Sea Diſeaſes; or, a Treatiſe of their Nature, Cauſes, and Cure. Alſo an Eſſay on Bleeding in Fevers, ſhewing the Quantity of Blood to be let in any of their Periods. By* W. Cockburn, M. D. *late Phyſician of his Majeſty's Fleet,* F. R. S. 291

27. *Of the Genital Parts of Men,* &c. *From* De Graaf. 311

28. *Of the* Penis. *From the ſame.* 216

29. *Of the Parts of Generation in Men, and the Diſeaſes ſubject thereto, particularly thoſe of the* Penis. *From* Verheyen, St. Hillaire, *&c.* 322

Tract 30. *Of the Diſeaſes ſubject to the Parts of Generation in Men. From the ſame Authors.* Page 325

31. *Of the Organs of Generation in Women.* 328

32. *Of the* Placenta Uterina, *the Umbilical Veſſels, the Membranes that involve the* Fœtus, *and the Liquors that they contain; the Situation of the* Fœtus *in the Womb, the Ligitimate Time, the Nouriſhment of the* Fœtus, *the Difference of a* Fœtus *before Birth, and after.* 336

33. *Of the* Catamenia, *or* Menſes. 339

34. *Of Generation.* 342

35. *Of the Generation, Formation, Nutrition, and Birth of the* Fœtus *from the Mother's Womb. Taken from* Harvey, Needham, Leeuwenhoeck, De Graef, Swammerdam, St. Hillaire, Tauvery, Mery, and Buſſiere. 347

36. *An Account of a Book writ in* Italian, *concerning Generation, by an Anonymous Author, and dedicated to* Malpighius. 350

37. *An Extract of a Letter of Monſieur* De St. Maurice, M. D. *to Monſieur* De la Cloſure, *concerning the Formation of a* Fœtus *in the Teſticle. Taken out of the* Journal de Medicine *publiſhed at* Paris. 351

38. *An Obſervation of an uncommon Caſe of a Dropſy contain'd between the Tunicks or Coats of the Womb. Taken from the* Philoſophical Tranſactions, January 169⅞. 354

39. *The Conduct of Nature in forming an Animal from an Egg.* 355

40. *Of the Diſeaſes ſubject to the Parts of Generation in Women; and firſt of the Womb. From* St. Hillaire, *&c.* 360

41. *Of the Delivery of Women. From Monſ.* Dion. 375

42. *Of delivering Women, and the Diſeaſes attending them. By Monſieur* Vaugion, M. D. 385

43. *Of the* Cæſarean *Birth.* 434

44. *Of the Diſeaſes, and their Cures, that are more peculiar to the Privy-Parts, as well as the Parts of Generation in both Sexes; eſpecially of the* Fiſtula in Ano, *with the Caſe of the preſent* French *King. Taken from Mr.* Monnier's *Treatiſe of the* Fiſtula, *and dedicated to Monſieur* Fælix, *firſt Chirurgeon to that King; and the reſt from* Michaelis, Etmuller, St. Hilaire, Dionis, *&c.* 436

Tract 45. *Two*

Tract 45. *Two remarkable Cases of the* Bubonocele. *From Mr.* John Proctor, *Surgeon at* Carlisle *in* Cumberland. Page 436, 440, 442

46. *Of reducing the Fundament and Womb, and opening Parts imperforate, as the* Vulva, Penis, *or* Fundament, *&c. By Monsieur* Vaugion. 442

47. *Of Castration.* 445

48. *Of* Lythotomy, *or Cutting of the Stone.* 449

49. *Of the Function of the* Peræneum. 457

50. *Of the* Fistula in Ano. 458

51. *Of the Operations to be performed in the* Anus: *From Mr.* Dion. *And of cutting for the* Fistula in Ano; *with the History of that of the* French *King, performed by Monsieur* Fælix, *his Chief Surgeon.* 461

52. *Of the Diseases and Cures incident to Women and Children. From* Michael, St. Hilaire, Harris, Mead, *&c.* 474

53. *Of the Diseases incident to Women with Child, and their several Cures. From the same Authors.* 489

54. *Of the Diseases of Children, and their Cures. From* Michaelis, *Dr.* Harris's De Morbis Infantium, &c. 499

55. *Of the* Medico; *Chirurgical Observations about the Infirmities of Women. By* John Van Meeckren, *Chirurgion to the City of* Amsterdam, *&c.* 504

56. *A Letter from* Abraham Cyprianus, *Doctor of Physick,* &c. *relating the History of a Humane* Fœtus *of One and twenty Months, taken from the* Tubes *of the* Matrix *before the Death of the Mother.* 517

Tract 57. *Of Fevers in general from* D. Gagnon, Sieur de Santigny, *Monsieur* Chaillon, Wallis, Morton, Sydenham, Carleton, *&c.* Page 526

58. *A Continuation of Fevers, as also of the Small-Pox, Measles,* &c. *From* Michael, Sydenham, Morton, Cole, *&c. With an Account of the* Cortex: *From Dr.* Paxton, &c. 549

59. *A further Continuation of the same. From the best Authors.* 560

60. *Of the Venereal Disease: A particular Tract from* Musitanus. 571

61. *Of the Gonorrhea and Salivation. From* Paxton. 571

62. *Of a Confirmed Pox. By* Blancard, Michael Torres, *&c.* 574

63. *Of Mercury; and if that be the Specifick Medicine for the Venereal Disease. From the same Author.* 578

65. *Of the* Gonorrhea *both in Men and Women. From* Torres, *Dr.* Drake, *&c.* 599

66. *Of the Operations performed on the Bladder,* &c. *From* Dion. *And of cutting for the Stone.* 605

67. *Several Remarkable Cases which have been communicated to us by Physicians, Surgeons,* &c. 619

68. *An Account of several Wounds and Diseases, with remarkable Cases and Cures on several Persons. From* G. Bidloo. 622

69. *A Chirurgical Dispensatory; shewing the Manner of Choosing, and the Prepartion of such Medicines as are most necessary for Surgeons.* 632

An

An Account of the CUTS, and *Pages* where to find them in this Third and laſt Volume of the *Bibliotheca Anatomica*.

PLATE *the* 1*d and* 2*d*, 3*d and* 4*th, all in one; Of the Veſſels of Generation, or Genital Parts of Men. Taken from* Reynerus De Graef, *Phyſician at* Delph: *Containing,*

Tab. 1. Fig. I. *Of the Veſſels, called* Præparantia *or* Differentia *of the* Teſticles.

Fig. 2. *Of the Preparing Vein from the deſcending Trunk of the* Vena Cava, *running to the very* Teſticle. Page 306

Fig. 3. *Part of the* Vas Deferens *in which the Cavity is conſpicuous.* 307

Tab. 2. *Shews the Humane* Teſticles, *with their proper Covering and Veſſels, in three Figures.* 307

Tab. 3. *Shews the Figure of Brute Animals, in which the Teſticular Veſſels may more eaſily and plainly be ſeen as well from Art as Nature, in Five Figures.* 308, 309

Tab. 4. *Shews the Humane* Teſticles *diſſected ſeveral Ways, with the Glandulous Body, in Six Figures.* 309, 310

Plate 2. *Contains Four large Figures of the Organs of Generation in Men. Taken from* De Graef. *Whereof* Tab. 8. *ſhews the Genital Parts as cohering from within.* 344

Tab. 9. Fig. 1. *Shews the* Virile *Member divided in the Middle, from the upper Part to the* Urethra 345

Fig. 2. *Shews the* Virile *Member opened length-ways.* 345

Fig. 3. *The* Virile *Member cut traverſe* 345

Tab. 10. *The Explanation of Two Figures taken from* Swammerdam, *viz.* Fig. 1. *ſhews the back Proſpect of the* Uterus *of a Woman after Delivery.* 346

Fig. 2. *One of the* Fallopian Tubes, *with its Blood-Veſſels filled with Quick-ſilver and Wind, to ſhew their Progreſs on one of the* Alæ Veſpertilionum, *with the rectricular Diſtribution of the* Veins *on the Parts of the* Tube, *and its foliated Expanſion, whereby theſe Parts became diſtended, and are rendred capable each of embracing the* Ovarium *on their own Side, in order to convey the* Semen Maſculinum *from the* Uterus, *as well as to tranſmit the Impregnated Egg afterwards to its* Fundus. Page 347

Tab. 8. *A large Plate containing ſeveral Figures of the Parts of Generation in Women. Taken from* Swammerdam.

Fig. 1. *The fore Proſpect of the* Uterus *in a Woman after Delivery.* 382

Fig. 2. *Exhibiting the* Pudenda *of a Virgin, taken freſh out of the Body, and diſplayed.*

Fig. 3. *The* Pudenda *of a Virgin, with its* Clitoris *dried.*

Fig. 4. *The Slit of the* Hymen, *&c.* 382, 383

Tab. 9. *From the ſame Author.*

Fig. 1. *Shews the* Uterus *of a Virgin.*

Fig. 2. *The Body of the* Clitoris *diſtended with Wind, as with Blood* in Coitu.

Tab. 10. *Two large Plates containing many Figures of the Delivery of Women. Taken from Monſieur* Viardell, *Chirurgion to the late* French *Queen.* 435

Tab. 2. Fig. 1. *Repreſents the Deſcent of the Womb called the* Precipitation. 435

Fig. 2. *Repreſents the Turning of the Womb inſide out by too great a Violence in the Delivery of the After Birth.* 435

A very large Plate, done by Dr. Cyprianus, *deſcribing the Birth, &c. of a* Fœtus *One and twenty Months in the Womb.* 524

Fig. 1. *Repreſents the* Fœtus, *as it appeared in the Operation.* 525

Fig. 2. *The Bottom of the Womb.*

Fig. 3. *The* Fallopian Tubes, *&c. full of Water.* 525

Tab. 11. *The Caſe of an Exuberated* Teſtis. 619

Biblio-

THE THIRD VOLUME OF

Bibliotheca Anatomica, Medica, Chirurgica, &c.

Of the Motion of the Blood; and first of Sanguification and Nutrition. From Harvey, Gliſſon, Lower, Walæus, Verheyen, Drake, *&c.*

BEFORE we enter upon the large Field concerning the Motion or Circulation of the Blood, we ſhall ſay ſomething of *Sanguification* and *Nutrition*. The Blood then is a warm red Liquor, or the reddeſt Part of all the Maſs of Fluids in the Animal Body, that circulates by Means of the Arteries and Veins through every Part of the Body.

While it circulates in the Veſſels, it appears a homogeneous or uniform Liquor; but being let out, as it gradually cools, it ſeparates ſpontaneouſly into two diſtinct Parts, a *Craſſamentum* or red coherent Maſs, and a *Serum* or tranſparent Part, which ſtill retains its Fluidity, and being ſomething the more ſpecifically heavy of the two, ſuſtains and bears up the red Part which ſwims in it; the Proportion of which two in the Mix'd, is ordinarily about one and a half of the *Serum* to one of the *Craſſamentum*. I have pitch'd upon this Proportion (ſays the Accurate *Drake*) as a *Medium* betwixt the Exceſſes on both Sides: But the Reader is not to be ſurpriz'd, if he ſometimes finds the Proportion vaſtly different from what I have here given even in Perſons of ſound Health; for as to this Point, Nature ſeems not to have ſettled any perfect Standard, but the Blood of ſome will be more watry or ſerous, of others more fibrous, than this Proportion ſeems to allow, and yet no viſible Difference be found in the Perſons as to Point of Health; and therefore I propoſe this as a Meaſure of a Thing not reduced to a Certainty, and in which therefore a great Latitude is to be allow'd.

The Blood is deriv'd from the *Chyle*, which having paſs'd the Lacteals of the ſeveral Kinds, is deliver'd into the Blood at the

Subclavian, whence they paſs together to the right Ventricle of the Heart, and there being yet more intimately mix'd, circulate thence forwards together through the whole Body, till after ſeveral Circulations and Depurations at the ſeveral Colatures or Strainers of the Body, they are (as the Chymiſts call it) cohobated or aſſimulated, ſo as to make one uniform compound Maſs, which ſeems to be nothing elſe but *Chyle* alter'd by the Artifice of Nature, and exalted into Blood; for it does not appear that any Thing extraneous is mix'd with the Liquor circulating in the *Blood Veſſels* but *Chyle*, except what was firſt ſeparated from it for particular Uſes, and what, after having ſerv'd them, it returned to it, unleſs perhaps it may receive ſome Portion of Air in the Lungs, which has been a Queſtion much diſcuſs'd *pro* and *con*, but not yet brought to any certain Deciſion by any Arguments that yet appear to have been produced on either Side the Queſtion.

That there is a Quantity of Air mix'd with the Blood, and circulating along with it, is paſt Doubt; but whether any more than was at firſt contained in the Bodies out of which the *Chyle* was made, and was then tranſmitted along with it to the Blood, is a Queſtion not yet decided: Nor perhaps is it eaſy to find Arguments that ſhall be demonſtratively concluſive either Way; though if there were any *Air* introduced into the Blood by any other Paſſage than the *Lacteals* in the Manner already mentioned, it would be a Diſcovery of very great Importance, and that might tend to the Solution of many doubtful Problems in the Animal Oeconomy, if the Way and Method of its Entrance could be clearly demonſtrated; but that not being done even for the Lungs, the moſt probable Way, we ſhall not preſume ſo far as abſolutely either to receive or reject the Opinion.

The Neceſſity of Reſpiration, and the florid Colour which the Blood receives in the Lungs, and firſt ſhews in the *Vena Pulmonaris*, are the Arguments which thoſe who contend for the Admiſſion of the Air into the Blood that Way inſiſt moſt upon. For the firſt of them, we have already accounted in the Second Volume. The latter is chiefly ſupported by the Experiment of turning the grumous red Part of the Blood after Coagulation upon *Blood-letting*, by which it is obſerved, that the under Surface, which was before blackiſh, being turn'd up, and expoſed to the Air, acquires a florid Colour, like that of the Blood in the *Vena Pulmonaris*; from whence they argue, that this Change wrought is in both Caſes by the ſame Means, *viz.* by the Contact of the Air. But for this Change in the Lungs, thoſe who oppoſe the Admiſſion of the *Air*, pretend to account by the extraordinary Agitation of the Blood in the Lungs, which they think ſufficient, by Comminution only, to impart the bright Colour.

There is an Experiment indeed which ſeems to favour the real Admiſſion of Air, which is, that keeping the Lungs of a Sheep, or other Animal, in a pendulous or hanging Poſture, if Water be poured into the *Trachea* till it be full, the Water will firſt inſinuate it ſelf into the Air Veſſels, and thence return very freely through the Blood Veſſels. This (ſays Dr. *Drake*) I have tried very often; but as I obſerved it would flow as freely from the Artery as the Vein, which, together with the Hydropical Diſtention of the Veſſels themſelves, render it ſuſpected that the Continuity of thoſe very tender Parts was broken by the Weight of the Water; and therefore he cautions not to lay too much Streſs upon this Experiment, but propounds it only in order to farther leſs ſuſpicious Trials.

But whenceſoever derived, and how little ſoever it may be, this included Air is that which gives the expanſive Motion or Spring to the Maſs of Blood, and conſequently is the Cauſe of the Incaleſcence or Warmth of it, which may thence eaſily be accounted for without having Recourſe to *Acids* and *Alkali's*, or *Chymical Principles*; for *Air*, whereſoever included, is compreſs'd, as it muſt neceſſarily be in all Liquors, and will endeavour to expand it ſelf, and conſequently, if it be ſtrong enough, drive outward the Parts of the Body that incloſe it; by which Means it cauſes the Blood to beat againſt the Sides of the *Veſſels*, which having *muſculous contracting Coats*, do in their Turns compreſs it again, and ſo cauſe a *reciprocal Æſtus* or Heat in the Blood greater than the meer circulatory Motion could; whence the

the Parts of the Solids or containing Veſſels being put into a conſtant Agitation, as well as the Fluids, a Heat is produc'd in both, which they mutually impart to each other.

Beſides this *Air*, the Blood conſiſts of ſeveral Sorts of Parts, to ſome one or more of which, and their mutual Action upon one another, the inteſtine Motion of the Blood has hitherto generally been imputed. Thoſe which upon the *Analyſis* offer themſelves to our View, are two Sorts, as Salts, a Quantity of Oil; which by ſome nice *Examiners* have likewiſe been found to be of two Sorts, a great deal of Flegm or Water, a good Quantity of *Caput mortuum*; which, however ſimple it may appear, may, for ought we know, conſiſt of divers Subſtances eſſentially diſtinct from one another; but for Want of ſufficient Ways of *Probation*, all that we get out of it, is a little fixed Salt by *Incineration*.

The *Chymiſts*, according to their wonted Method and Principles, account for the Colour of the Blood from the Exaltation of its *Sulphur*, which, whether true or falſe, is *gratis dictum*, and altogether as unſatisfactory as it is arbitrary. However, ſince the Doctrine of Colours in general is not applicable to Medicinal Uſe, it is not an Inquiry very neceſſary to be proſecuted in an Anatomical Work. However, that accurate ſagacious Inquirer *Alphonſus Borellus* not ſatisfied with ſuch wide *vague* Idea's of Natural Cauſes, thought fit to examine the Ground or *Materia ſubſtrata* of the Redneſs of the Blood by a Method more ſimple, and (I think) in ſuch Caſes more likely to ſucceed than the Chymical, which deſtroys the *Concrete*, and with a new Texture introduces Appearances. He took a Parcel of the *Craſſamentum*, after it had ſeparated it ſelf from the *Serum* as far as ſpontaneouſly it would, and waſhing it frequently in Water, found, that by that Way it was ſeparable into a viſcous ſlippery Subſtance, conſiſting of white or colourleſs Fibres, which riſes to the Surface of the Water, and there gathers into a Skin or coherent Pellicle of a Reticular or Net-like Texture, and deep *red Powder*, which precipitated pretty plentifully to the Bottom.

This Experiment ſhews, that the red Colour of the Blood is imparted to the *Blood* by particular *tinging Particles*, as in the common Experiments of *Dyers*, tho' not ſo inſeparably as many of theirs, moſt of which they know however very well how to *diſcharge*. It might therefore be very well worth that Man's while, who will reaſon about the Colour of the Blood from the *Hypoſtatical Principles* of the Chymiſts, to examine the Red precipitate apart, and ſo with which of their Elements it moſt abounds, which might perhaps teach them to be more wary in pronouncing about the Original of Colours. This fine red Colour, however generally found in the Blood of terreſtrious Animals, and moſt others, is not abſolutely neceſſary or eſſential to it; for beſides that divers whole *Species* have their circulating Liquor *white* or *limpid*, which I ſhould not ſcruple to call *Blood*, I have ſeen Blood (ſays Dr. *Drake*) let out to the Quantity of a Pint or more, from the *Median* of a Man, which was all of a pure *Milk White*, which did not, when cold, ſeparate into a *Craſſamentum*, as the Red uſually does, nor yield a Skin or Cream, nor turn ſowr upon keeping, as Milk does, which to Appearance it very much reſembled, but remained ſweet without parting Subſtances for ſome Weeks, and at laſt corrupted and ſtunk, after almoſt three Months that I kept it fluid in a Viol, and then a very ſlight Separation enſued of the whiter Part from a *Whey-coloured Liquor*; but neither was the *Coagulum* near ſo ſtrong as that of *ſowr Milk*, nor the Liquor ſo tranſparent as *Serum* or *Whey*, nor either in Smell or Taſte inclined to be ſowr, but had at laſt a Smell pretty ſtrong of Putrefaction. The Man from whom it was drawn, was lightly *Cachectical*, and both his Looks and Complaints were like Maids not very far gone in a *Chloroſis*.

Divers other Inſtances are to be found in Authors, of Blood that was not Red; and Dr. *Lower*, in his Book *De Corde*, relates a remarkable Caſe of one that bled ſo long at the Noſe, that at laſt the Broth which he drank for his Supper flow'd little alter'd the ſame Way, as Blood: But that Caſe of the White Blood above recited, being the moſt compleat in its kind; for there was a Change made without any accidental Circumſtances of Force, or the Attendance of any extraordinary Inconveniencies, which was in a

Manner habitual, and did not probably come upon the Man in an Inſtant, or a ſhort Time, nor vaniſh ſo; but in all Appearance had its leiſurely Steps and Gradations; during part at leaſt of which Time a Man muſt live, and do all the Offices of Life; which he ſeem'd to do in the main as well as others, eſpecially as ſuch to whom we have above compar'd his State, without what is vulgarly call'd Blood. It is propoſed more at large, That they who trouble themſelves to reaſon about the eſſential Qualities of Blood, may at Leiſure conſider wherein the Defect lay.

The Chymiſts perhaps will readily tell us, That Blood is a Liquor more *Sulphureous* than *Milk*, and that in this *Blood* which reſembled *Milk* ſo much, the *Sulphur* was not ſufficiently exalted to give the *Red Tincture*, which they derive from that Principle. On the other Hand, they who fetch the Colour from the Impregnation of the *Air* in the *Lungs*, may fancy a Defect or Obſtruction of the Paſſage of the *Air* into the Blood in that Part, by which Means it was defrauded of that Colour or Spirituoſity, which otherwiſe I ſhould have had. Either of theſe Opinions may be true, but they are both improv'd, and therefore neither to be inſiſted on. But there is another Difficulty; which is, That this *White Blood*, after it had been let out from the Vein, above the uſual Time of Separation, either in *Blood* or *Milk*, did not yet follow the Courſe of either, but ſtill preſerv'd its Mixture, without parting into a *Craſſamentum* and *Serum*, or into a *Coagulum* and *Whey*.

Here the Chymiſts have a fair Opportunity to pretend to *Libration* or equal *Temperature* of their *Salts*, and to ſay that the Proportion of 'em was ſuch, that the *Alkalious* hindered the *Acid* from procuring a *Coagulum*, and the *Acid* prevented a ſpeedy Corruption from the volatile *Alkalious*, and ſo betwixt them preſerv'd the State that it appear'd in at the firſt letting out, longer than is uſual in Liquors, that have had their due Exaltation. On the other Hand, they that hold the Mixture of Air with the Blood in the *Lungs*, may at leaſt with equal Reaſon ſay, That this Blood, not having received in the Lungs a Quantity of Air ſufficient for its Perfection and Colour, continued yet enough to maintain it in the State of *Fluidity*, though not ſufficient to bring it ſpeedily to Putrefaction; which however it did at laſt, after an unuſual Length of Time: But this is left to further Enquiry.

To return to the Hiſtory of laudable well conſtituted *Blood*: The viſible Elements of it are thoſe which the *Laboratories* of the *Chymiſts* produce ſeparate, though perhaps much alter'd by the Furnace; for it is paſt all Controverſy that the *Empyreumatical Oils* drawn from the Blood by Fire, differ *toto Cælo* from the natural Fat, or Oil, which circulates with the *Blood*: Nor is it improbable that the *Salts* raiſed from *Blood*, or other Animal *Liquors*, are in the Operation very much acuated; or at leaſt, that the various Combinations of them, by which they were circulated in the *Blood*, are ſo deſtroyed as to render them quite a different Thing from what they were in the natural State. It may likewiſe be a reaſonable Doubt, whether the Earth, or *Caput Mortuum* which remains in the Retort after the Diſtillation ended, be not a new Production, which had no Exiſtence under any Form reſembling that in the Blood it ſelf; and it is probable that it is the Reſult of the heavier Salts and Oils, which being deſtitute of their more fluid Parts, are in a manner torrified in the Proceſs, and put on a *Shape*, Conſiſtence and Rigidity, which naturally they never had. But this latter Doubt I would not extend too far, becauſe the Nouriſhment of the Bones ſeems neceſſarily to require ſomething more ſolid than Oil, and leſs fluxil than Salt, which may ſerve to give a Conſiſtence and Temper to thoſe Two, of which the Bones by their *Analyſis* are found mainly to conſiſt.

From thoſe *Principles* or *Elements* variouſly combin'd and diſtributed by the *Circulatory Motion* impreſs'd by the Heart, as has been already ſhewn in the Second Volume, and by the *Oſcillatory expanſive* Motion of the interſpers'd Air, and the Reaction and Reſtitution of the contractile Veſſels through which it paſſes, flow all the Properties and Operations of the Blood. From this Mixture of Elements, and their lax Compoſition, it is ſuſceptible of various Alterations and Impreſſions, of which the Principal are

Coagu-

agulation, which almoſt conſtantly attends e Parts of it, when out of the Body; ut if generally within the Body, it muſt mortal inſtantaneouſly, and therefore ch a State of the Blood does not appear er to have happened without artificial rocurement. *Diſſolution*, which is an Af-ction juſt contrary to the former, and is ch a Comminution of the Fibrous Parts the Blood, as it indiſpoſes it for that Se-ration of the *Craſſamentum* from the ſerous rt, which always enſues in Healthy Blood on cooling out of the Body, if received to a deep Veſſel; for upon a plain Surface will not ſeparate. This Diſſolution, or oken Texture of the Blood, is often the onſequence of *Malignant* and *Peſtilen-l Fevers*, and ſhows it ſelf in the *Petechiæ*, *Purple Spots*; and in many of theſe Caſes, e *Blood* taken away by *Phlebotomy* will not arate into a *Craſſamentum* and *ſerous Part*. is Sort of Diſſolution is likewiſe oc-ſion'd by ſome Kinds of *Poiſons*; among hich may be reckon'd, the Bites of Vene-ous Animals; as *Rattle-Snakes*, *Vipers*, &c. ſome of which however, the *Diſſolution* not Total, but Partial, and therefore over-me by proper Applications. Thoſe Two ntrary Affections of the *Blood*, when they ing from an *Internal Cauſe*, ariſe from the poſite Kinds of *Salts*, *Acids*, and *Volatile kalies*. For though in an Humane Body ſincere *Air* is to be found, nor could it eed be conſiſtent with Life; yet it may, d does often enter the Blood ſo compoun-, as to bridle the *Volatile Alkalious*, ch is the true Salt of the *Blood*, and ſo der the due Attenuation and Mixture of ſeveral Parts; as in the Caſe of a *Dia-s*, and perhaps, in a *Chloroſis*, where the od is thick and torpid. On the other nd, where the *Alkalious* are too redun-t, and unbridled or exalted, the Blood render'd too thin and fluid; ſo that the ſcrimination of its conſiſtent Parts is loſt, ording to the ſeveral Degrees of which, ow *Hypermenſtruations*, *Purple Spots*, *Bloody ine*, *Sweat*, &c.

Another *Diſaffection*, which is very fre-nt in the *Blood*, is a too great Abundance *Oils* or *Salt Particles*; by Means of which, active Parts of the Blood being too ch clogg'd, the Faculties of the Body are not ſo vigorouſly exerted, and thoſe Parts which ſhould be ſeparated from the Blood for the peculiar Uſes are intangled and de-tain'd, whereby the Ends for which they are occaſion'd by Nature to be ſeparated are not ſufficiently anſwer'd; and perhaps, which may be done of the leaſt Inconve-niencies of an *over-oily Blood*: The ſolid Parts through and by which it paſſes, are too much lubricated and ſuppled, and the Tone of them thereby vitiated; and conſe-quently their Spring relax'd, and their Action impair'd; from hence proceed that *ſluggiſh In-activity* and *Drowſineſs* which generally at-tend very fat People; whoſe *Nerves*, *Mem-branes*, and other *Tenſe Parts*, are relax'd by the too great Quantity of Fat with which the Blood abounds.

The contrary Affection to this is, the De-fect of Oil in the *Blood*; which being as it were its *Balſam* Lines, and preſerves all the Parts from being fretted and corroded by the *Salts*; whoſe *Spicula* or Edges are engag'd, and as it were, ſheath'd in this ſoft *Balſamick Matter*, and ſo kept from attending the ſolid Parts, as they conſtantly do where this is wanting. This *Dyſcraſy* of the Blood is uſually attended with a general *Atrophy*, and a fretting or corroding of ſome particu-lar Parts; whence ariſe *ſerous Defluxions*, *Apoſtemations* and *Ulcers*, &c. to which all Parts of the Body are liable in ſuch a State of the Blood, eſpecially the *Lungs*, whoſe tender *Veſiculous* Subſtance is more eaſily annoy'd than any other, by the Acrimony of the *Salt Serum*; whenever this happens, if it be not ſpeedily corrected, a *Phthiſick* ſoon follows, in the *Acme* of which the Lungs become ulcerated.

Theſe are the principal *Dyſcraſies* or Diſaf-fections of the *Blood*, relating to its Tem-perature and due Mixture; for as to its Ter-reſtrious Part, or *Element* of Earth, the Ex-ceſſes or Defects of that are not ſo notorious, and conſequently the Proportion which it holds to the reſt is not ſo eaſily to be diſco-vered and adjuſted, unleſs perhaps the *Cre-taceous Tophi*, and *Calculous Concretions* ſo fre-quently found in Animal Bodies, may be ſaid to be the Product of a Redundance of Earth in the *Blood*: But if that be ſo, this *Dyſcraſy* does not ſhew it ſelf very apparent-ly in the *Blood*, by any Thing but its Effects,

Effects, neither does it afford any clear *Indications*. For thoſe that in theſe Caſes *Phyſicians* have been able to find, are generally drawn from the Exceſs and Kinds of the *Salts*, which are always combin'd in great Quantity in this ſort of *Concretions*; and all the Scope that they rationally drive at from their *Preſervative* or *Curative Indications*, is to prevent thoſe *Coagulations*, of which they look upon the *Salts* to be the Cauſe, or to diſſolve them, when but looſely form'd. For whatever, farther ſome may pretend to in theſe Caſes, is but the vain Boaſtings of *Charletuns* and *Empiricks*, who cheat the People with their Pretences to infallible *Diſſolvents*, of *firmly compacted Stones*, which they impudently pretend to have done, whenever by the ordinary Means diſguiſed, they happen to drive out any *looſe unknit Gravel*, or *ſmall Stones*.

All the other *Dyſcraſies* of the Blood diſcover themſelves readily enough to the *Eye*, the *Touch*, or the *Taſt*, of a diligent, judicious Inquirer. But this only betrays it ſelf none of theſe Ways, and is to be found out by Reaſoning, and Conſequences drawn from Hypothetical Cauſes; in which we may eaſily be deceiv'd, though there be a Neceſſity ſometimes of uſing them. We can eaſily ſee whether the Blood be of greater or leſs Conſiſtence than in a State of Health it ought to be; we can ſee and feel whether it abounds with *Seroſities*, or Oil; and we can taſt, or ever feel the *Aſperities* of the *Salts*: The *Earth* only, which is eſteem'd the groſſeſt of all the *Hypoſtatical Elements*, eludes all theſe Trials, and leaves us to find it in its Effects.

However, as the Exceſſes and Defects of the other *Elements* are the moſt diſcoverable, ſo are they likewiſe the moſt important; and by their various Combinations and Complications, produce moſt of the Diſeaſes of the Diſtempers of the Body, and therefore the Conſtitution of the *Blood* ſhould upon all Occaſions of *Phlebotomy* be nicely inquired into with more Curioſity and Exactneſs than I doubt Phyſicians generally uſe; who ordinarily content themſelves with a ſuperficial View, or perhaps a ſlight Taſt with the End of the Finger; whereas they ought in many Caſes to feel carefully, and examine by their Touch the Degree of *Cohæſion* and *Tenacity* in the Grumous Part after Separation, as well as the Smoothneſs and Oleoſity of both Parts: And if they did by frequent weighing a Stated Meaſure examine the Specifick Gravity of *Morbid* in different Caſes, and of ſound Blood, likewiſe they might perhaps arrive at a Standard of the Quantity of Air contain'd in them, and thereby diſcover when the Diſeaſe proceeded from an Exceſs or Defect of *Air* incorporated in it. It is certain that the light looſe Obſervations made upon *Blood* by our *Surgeons*, and *Blood-letting Apothecaries*, are very ſuperficial and unſatisfactory; and the Judgments that they make upon them generally erroneous and falſe, for minding only the *Superficies* and Colour of the Blood, or perhaps the appearing Quantity of *Serum* in it, they roundly pronounce it Good or Bad, Rich or Poor, without minding any other Circumſtances. Thus if the Colour be florid or gay, they readily commend it for good *Blood*, although perhaps it be *Hypochondriacal* or *Flatulent*, or have in it the *Rudiments* and Tokens of an *Incipient Inflammation*; in both which Caſes the *Blood* will be very *florid*, becauſe the *Texture* of it is pretty looſe and broken. But having heard there were ſuch Things in the *Blood* as *Red Globules*, from which indeed the *French Phyſicians* and *Philoſophers* have, upon the Score of the Figure, generally derived the Redneſs of the *Blood*, tho' according to the Doctrine of that incomparable *Mathematician* and *Philoſopher*, Sir *Iſaac Newton*, Red being the Colour leaſt *Refrangible* and leaſt *Refracted*, the *Globular* Figure is of all others the leaſt apt to produce that Colour, as being the moſt *Refrangible*; they conclude the Globules of the Blood ſafe and entire, and conſequently all elſe well on the other Hand: When they ſee the *ſizy Pellicle*, they preſently cry out of *Acidity*, which cauſes, in their Opinion, that ſtiff *Coagulum*; whereas it is the Product of the direct contrary, and is only a Mixture of the *Aqueous* and *Oily* Part of the *Blood*, by Means of too much *Volatile Salt*; which, by an Intenſe Heat, are inſeparably incorporated, as appears by the ſtiff *Jellies* produced in the *Philoſophical Digeſtor*; which both in *Colour*, *Conſiſtence* and *Tenacity*, reſembles the *ſizy Skin*, which by its Appearance

pearance always on the Surface, ſhews it ſelf to conſiſt of the higheſt Parts of the *Blood*. The viſible Changes that happened beyond theſe are generally Matter of Surprize, and not Inſtruction to them, and are uſually the Objects of their Wonder, not Judgment; which it is not to our preſent Purpoſe to proſecute here, it being ſufficient to have given a *Hint* to the Judicious Inquirer, who we pretend not ſo much to inform as to excite.

There are other Diſorders in the *Blood*, which do not originally ſpring from any *dyſcraſy* or undue Mixture of its *Elements*, but from an Alteration in the *Motion*; ſuch as an *Augmentation* or *Diminution* of the Degree of *Velocity* in the *Progreſſive* Motion, or the ſame Changes in the Degree of the *Expanſive*, by which ſupernatural *Fermentations* are induced, or the neceſſary ones damp'd and check'd, and the *Progreſs* of the *Blood* too much hurried or retarded, which depend upon various Cauſes, very different from one another: As ſometimes on Matters taken in *ab extra*, as in *Fevers* and other Diſorders occaſion'd by *Surfeits*, *Debauches*, or *Drugs*; ſometimes by too violent *Exerciſe*, or *catching Colds*: At other Times, by ſome latent Malignity, or Indiſpoſition of the *Air*; from whence proceed Epidemical Diſeaſes, and very often by ſome vicious peccant Humours generated in the Body it ſelf, and reaſſumed into the *Blood*; which are too many to be enumerated here, without entering into a Detail of almoſt all the Diſeaſes of the *Blood*. In this Sort of Diſorders the Spirits are too often accuſed, which is ſo convenient a Shift, and ſo fitted to be uſed on all Occaſions, that it is grown almoſt the common *Aſylum* of all Baffled *Reaſoners*; who, when they are puzzled, need do no more than lay the Fault upon the *Spirits*, and the Difficulty is over without any Trouble, for they are always at Hand to bear the Blame: But this is explaining *Obſcurum per Obſcurius*, till ſome Body or other gives us better Demonſtration of their Exiſtence, Nature and Operations, than our Ignorance and Want of ſomething to fill their Place, and ſtop a Gap in our Philoſophy, have done.

The *Solids* likewiſe have their Share in the diſorderly Motions of the *Blood*; for according as the Tone of the reſpective Parts thro' which the *Fluids* paſs is *over-tenſe*, or too *lax*, the Motion of the Humours will be promoted or retarded thereby. For in caſes of *Overtenſion* of the *Veſſels*, the Preſſure of the *Fluids* will, by the *Reſtitution* or *Elaſtick* Return of their *Parietes*, be reverberated with greater Strength, and conſequently a greater Motion will thereby be impreſs'd upon them, and the Celerity of it encreaſed in proportion. But in a Relaxation or *Atonia* of the ſame Veſſels, the Expanſion of the *Fluids*, towards which they have a perpetual Tendency from Cauſes already mentioned, will neceſſarily be greater from the yielding of the Veſſels, but the Progreſſive will loſe ſome of its Celerity, for want of the Repercuſſion of their Sides upon the *Fluids*, as it does in the Veins; which Reſolution of the *Tone* of the *Solids* may be one Cauſe of thoſe Symptoms which conſtantly attend *Epilepſies*, and other *Spaſmodic* Diſtempers.

The *Blood* thus variouſly compounded and circumſtantiated, viſits even the minuteſt Part of the Body by Means of the circulative Motion; of the Impulſe and Cauſes of which, and the Paſſages through which it is perform'd, an Account has been already given, which needs no Repetition here. In this Round, thoſe Particles of the Blood which conform beſt to the Figure and Structure of the Parts through which they paſs, are appoſited to them, either for their Augmentation, which is call'd *Accretion*, or for the Reparation of ſuch, as by the Conſtancy and Rapidity of the Circulatory Motion of the *Blood* muſt needs be worn off from them.

About the Matter from whence this Nouriſhment is derived, great Conteſts have ariſen amongſt *Phyſicians* and *Anatomiſts*, in which this only has been a Point agreed upon by common Conſent; That among the various Humours of the Body, there was one peculiar deſtined and contrived for that Office, but which that is has been the Diſpute. In which they ſeem to have ſhewn more Reading, Learning and Subtilty, than true underſtanding of the Point in Queſtion. Some have contended for a Nutricious *Juice* to be convey'd throughthe Nerves, in which ſome great Men of our own Country have

been

been the Principal Misleaders. Some have set up the *Lympha*; others, the *Chyle*, as the *Universal Succus Alibilis*. Some have appointed the *Serum* or *Albumen* of the *Blood*, which is nothing else but the *Lympha*, for that Office, which others assign to the *Crassamentum*. And there are some, who out of several Elementary Parts of each, or all these, make various Combinations, according to their own Fancies; from whence they have form'd an almost innumerable Variety of *Hypotheses:* All of them carrying seeming Probability, yet none of Conviction; at least not to me. The Reason of this Miscarriage of so many great Wits, seems not to be any Want in them of Qualifications sufficient for such Inquiries, but that the Matter is in its own Nature not precisely determinable.

However, all these, except they who bring a Nutritious *Juice* through the Nerves, agree that the *Blood* is the Vehicle that conveys the *Alimentary Parts* through all the Body, whatsoever they may be, and whencesoever derived. But perhaps upon the Score of its *Heterogeneity*, or Composition of different *Elements*, they did not make that it self the *Nutritious Fluid* without restraining the Faculty of Nourishing to some particular Parts of it; as thinking the general Account too *vague* and indefinite. I must confess, says the ingenious *Drake*, I think all those precise Determinations to be too narrow and restrain'd, and that the *Blood* in its largest Acceptation, including all those Parts which have been before described as belonging to it, is simple and homogeneous enough for the Purpose of *Nutrition:* He conceives therefore, that all the superficially different Parts, be they more or fewer than those we have already describ'd, which circulate together in the Vessels under the common Name of *Blood*, do contribute something either instrumentally or materially to the Augmentation or Reparation of the Parts through which they pass: But how much each precisely for his Share does separately contribute, he does not pretend to know, or affirm; that the Liquor which we call *Blood* consists precisely and exactly of so many *Elements*, or Parts Simple in relation to Sense, and our *Analysis* of it, and exactly no more.

Therefore, before we proceed to lay down this Author's Notion of *Nutrition*, it will be necessary to say something concerning *Sanguification*, another Point which has been very much canvassed among the Learned, but with as little Fruit and Satisfaction as the former: We shall not therefore trouble the Reader with the Discussion of such barren and useless *Questions*, as whether the *Liver*, the *Heart* or the *Blood*, &c. *Sanguify*, which serve rather to try the Wit and Invention of young Students, than to inform their Judgments. By *Sanguification*, is generally understood the *Assimilation* of the *Chyle* into *Blood*, which is supposed to be compleat, when the whole circulating Mass is saturated with a high *Red Colour*, and upon *Phlebotomy* separates in the Bason into a Red *Crassamentum*, and an *Amber-colour'd Serum* only, without any *White Matter* floating loose on the Surface, as the *Chyle* before perfect *Assimilation* will do.

The Physicians of the last Age, upon the Introduction and Reception of *Chymistry*, suspecting almost every Thing to be done by *Ferments*, and among the rest *Sanguification*, were therefore very Solicitous to circumscribe and fix it to the proper *Officina*, where they supposed this *Ferment* was prepared, or at least to be found; and great Disputes there were among them about it. Hence the *Liver* and the *Spleen* had sometimes their *Triumphs*, sometimes their *Obsequies* sang, as a fresh Champion or Adversary arose for or against their Cause: But conceiving the Notion of such Sort of *Ferments* are almost destroy'd, we shall not trouble the Reader here with them, till we come to treat of Fermentation and Digestion distinctly; neither shall we disturb the Ashes of the *Plastick Powers* and *Faculties* of the Ancients, long since deceased, since no Body is in Danger of reviving these Doctrines again with any Prospect of Success.

Of *Sanguification*, we may admit Two Degrees: The First of which amounts to no more than a *Confusion*, or such an intimate Mixture of Parts, as suffices so to confound the different Colour of Liquors, as that the Whiteness of the *Chyle* shall be so lost, or drown'd in the Red Colour of the *Blood*, as never more to appear again in its own Shape and Colour; to which how many *Circula-*

tions are neceſſary it is hard to determine: However, he that conſiders the ſeveral Motions as well *inteſtine* as *progreſſive*, will eaſily allow them ſufficient to produce ſuch a Mixture in no long Time.

The Second Degree of *Sanguification* is, when the Parts of the *Chyle* are ſo exalted or communicated, and ſubtiliz'd, as to loſe intirely the former Tendency to a *Coagulatory Separation*, ſuch as in *Chyle* and *Milk* they have in the ſpontaneous Separation, or curdling of which latter there is a Concurrence of a manifeſt *Acid*, which in the Separation of the Parts of Blood is never found, nor even in the moſt *Morbid* Caſe.

We have mention'd but Two Stages or Degrees of *Sanguification*; one while the Mixture is groſs and conſider'd only, and the other when the Parts are communicated and united, which ſeems to give us a ſufficient *Idea* of perfect *Blood*, though there may be, and undoubtedly are, ſeveral Steps or Degrees between theſe, which we neither need nor indeed are diſtinguiſh'd by any ſufficient Tokens, for want of knowing how many Circulations are neceſſary to make a perceptible Alteration in the aggregate Maſs. However, there is a farther Degree, in which the Parts are yet more exalted and ſubtiliz'd; but this being beyond what is Salutary, I account the Sanguification perfect without it. This latter is that State in which the Fibres and Filaments of the *Blood* are ſo broken and blended with the Aqueous Parts, as not to be again ſeparable from them, which therefore may be eſteem'd a Morbid *Sanguification*, ſuch as happens in *Peſtilential* and other *Fevers*; which are attended with *Bloody Sweat*, *Urine*, *Spots*, &c. and in which the *Blood* will not ſeparate when cool, tho' out of the Body.

All theſe Degrees, whether imperfect, perfect or Morbid, are procured by reiterated *Circulations*, in which as well the *Inteſtine* as *Progreſſive* Motion conſpires to the effecting the Mixture and Comminution of the Adventitious Parts, and undoubtedly have their ſtated Period, in which they arrive at Perfection, though where preciſely to fix that, is unknown to us; but that it is ſo is plain, by the Crudity of the *Chyle*, which may be found by letting *Blood* after a full Meal, in which the *Chyle* will appear diſtinct after many repeated Circulations, and by the too great *Fluidity* or over-intimate Mixture which appears in that State, which we call the *Morbid Sanguification*; in which there is undoubtedly the concurrence of ſome collateral Cauſe, beſides the natural Motions of the *Blood*, becauſe it is found in ſome peculiar Diſtempers only, though there may be many Degrees of Exceſs of Exaltation beyond the due State before it arrives at that inſeparable Pitch of *Fluidity*, which manifeſts it ſelf plainly to us; but being unheeded, and perhaps not cognizable by any viſible Token, we cannot account diſtinctly for them. It would indeed be of very great Service towards the Cure of Diſtempers, if ſuch adequate Trials could be invented as might diſcover the ſeveral Gradations towards or beyond *ſalutary Sanguification*: But theſe being yet unvented, muſt be left to future Induſtry and Sagacity.

By this Account of *Sanguification*, however rude and unaccurate, it will be obvious to any conſidering Perſon, that the ſame Difficulties that occur in ſettling the diſtinct Steps of *Sanguification*, are to be met with in *Nutrition* alſo: For whatever the *Nutritious Particles* may be, it is plain that from the firſt Admiſſion of the *Chyle* into the Blood, their Motion is confounded with the Motion of the Blood, and conformable to it, and conſequently that no diſtincter Account can be given.

Whatſoever Notions therefore Speculative Men may advance about the diſtinct and gradual Motions of the *Nutritious Matter*, and whatſoever Diſtributions they are pleaſed to make of this Sort of Matter to one Part, and that to another, they exiſt in Imagination: For as the nutritious Juice or Juices are mix'd, and circulate with the Blood through all the Parts of the Body, all that we can diſtinctly conceive of them is, that as the Excrementitious Parts are in their Paſſage ſeparated into ſpecifically diſtinct *Fluids*, by Means of Glands, whoſe Pores are adapted to receive ſuch Particles only as when they come together make ſuch a *peculiar Species* of *Fluid* as the *Urine*, which is ſeparated by the *Kidneys*, the Bile by the *Liver*, and the *Saliva* by the Glands about the Mouth, *&c.* So we may conclude without offering Violence to Reaſon, or ſtrain-

ing Inferences, that the Pores of the Parts to be nouriſh'd are ſo figured and form'd as to retain thoſe peculiar Particles which conform beſt to them. But we cannot with any Foundation pretend to tell what ſort of Particles each Part retains, unleſs we knew diſtinctly likewiſe how the Pores of thoſe Parts were diſpos'd, and could tell preciſely what Parts they were capable of receiving, and what only; which is a Degree of Knowledge we may doubt whether any Man has ever yet arriv'd at.

The *Analyſis* of the Parts do indeed give us ſome groſs *Idea* of the Materials whereof they were compounded, if we ſuppoſe that the Bodies which we ſeparate pre-exiſted in the Body; which are comparatively ſo very ſoft, ſhould endure ſo conſtant and ſo violent a Flux of Humours without Decay. In *young Bodies*, where the Veſſels are much tenderer, not only the Sides are ampliated by this expanſive Motion, and their Dimenſions that Way encreas'd, by receiving more than they loſe, but by the *Progreſſive Motion* which naturally and ſtrongly puſhes forward, and would not return but for the Bar and Check which they receive at the Extremities of the Veſſels, the containing Parts are gradually ſtretch'd out in Length, and by the Matter which inſinuates it ſelf every where into the Pores, are hindered from returning exactly to their firſt Dimenſions, by which Means they inſenſibly vegetate or grow; which they continue to do, till the ſupporting Parts, the Bones, growing by Degrees rigid and firm, admit of no farther Extenſion, and thereby put a ſtop to the farther Growth of the more flexile and yielding Parts, which are tied to and limited by them.

Thus the *Dimenſions* of the Body, as to *Length*, are circumſcrib'd to that preciſe *Stature* which it had at the Time when the Bones firſt acquir'd that unyielding Rigidity. And theſe Dimenſions every Limb maintains during the reſt of Life, unleſs by Accident a Bone be broken, or by any Diſtemper ſoftned again and render'd pliant; in which Caſe the other Parts follow the Figure and Dimenſion of the Bone. As when it happens that the fractured Parts of a broken Bone are not rightly put together again, as it often falls out in the Bone of the *Thigh*; where the under Part not being brought to correſpond rightly with the upper, the Weight of the Body making the upper bear downwards, they ſlip along each other, and the *Leg* is thereby ſhortened. The ſame Thing happens without a Change of Dimenſion of the Bones themſelves, if the Head of the *Thigh Bone* be turn'd out of its *Socket* in the *Iſchium*; in which Caſe the Weight of the Body makes the Trunk bear downwards, and the Fleſh yielding for the Head of the Bone to riſe, the *Leg* appears ſhortened.

What it is that determines the yielding of the Bones to a ſtated Time, pretty nearly agreeing almoſt always in all Perſons, is hard to tell. All that appears certain in it is, that this Rigidity of the Parts comes on gradually, and that from our firſt Conception to that Time, the Encreaſe is by Degrees leſs and leſs every Year; perhaps every Month, every Day, were we able to adjuſt our Obſervations ſo nicely as to calculate it. We may be ſenſible that many Times the Growth receives a Check from ſome contingent Circumſtances, of which we are not aware, and returns again when they ceaſe, though inſenſibly to us. In Diſeaſes we are indeed aware of this ſometimes, and think we know what to impute it to, tho' even that we cannot do preciſely. But it is not the ſolid Parts only that are tenderer in *young Animals* than in growing ones, but the Fluids themſelves are much more ſoft, and, as it were, grumous, as we find by that Juice which we call the *Gravy*, which the younger the Meat, the more *Gelatinous* it is.

Theſe ſeems to ſhew, that from whatever *Element* they are deriv'd, or however compounded, the nutritious Parts are *Fibrous*, *Soft* and *Gelatinous*; and that conſequently the leſs they are comminuted and ſubtiliz'd, the fitter they are for Nouriſhment. Hence it comes, that the Blood of Children having undergone few Circulations, in proportion to grown Perſons, is in the ſame Proportion more nutritious, and the Parts which are form'd out of it more ſoft, flexible and yielding; which ſoftens by length of Time and repeated Circulations, the *Fluids*, as well

well as Solids, gradually loſe, till the latter reſiſting the Impulſes of the Blood, a Stop is put to their Growth.

From hence alſo we may conclude, That *Bones* are form'd out of the moſt comminuted or broken Parts of the *Blood*, ſince we ſee that the Blood of old Men, which by a long Courſe of *Circulation*, becomes in a Manner unfit for the common Courſe of *Nutrition*, will however generate Bones, and convert into that ſort of Subſtance many of the *Tendons* and *Ligaments*, and even the Coats of the Veſſels themſelves, whoſe Subſtance being next to the *Bones*, the moſt compact, admits only of the ſmalleſt Particles of the Blood, which therefore ſooneſt become Oſſeous, as they are frequently found.

This *Theory* may furniſh us with a reaſonable Solution of that *Problem* which Dr. *Sydenham* propounds as unanſwerable, and as an Argument againſt the Uſe of *Theory* in *Phyſick*, why a Horſe or any other Animal arrives at his *Acme*, meaning his full Strength and Vigour, at a determinate Age; for tho' we cannot tell by what Proportions and Degrees this Softneſs, both of the Humours and ſolid Parts, wears off, yet we find that it gradually does ſo, and that all Sorts of Animals have a ſtated Period of Time in which the Circulations have reduced the Solids to ſuch a State of Reſiſtance, as to admit no longer of a Vegetative Encreaſe; and that gradually as this Vegetation declines, the Strength encreaſes, which depends upon the Reſiſtance that the *Solids* make to the *Fluids*; in which conſiſts the Strength of the *Muſcles*. For the Action or Force of a *Muſcle* conſiſting in the Reſiſtance, which the *Muſcular Fibres* make to the Effervescence of the *Blood*, or other *Fluid* included in the Belly of the *Muſcle*, the Animal is then ſtrongeſt, or in his greateſt Vigour, when his Muſcles are able to make the ſtouteſt Reſiſtance; which is, when they will no longer admit of a permanent Diſtention, that is, when they have done growing.

It may be objected, That the Reſiſtance of the Veſſels is yet greater in aged Perſons, and that according to this Theory it muſt be ſo; which notwithſtanding is attended with Stiffneſs, want of Strength, Vigour and Heat, which is confeſs'd. But theſe Things depending upon the mutual Action or Reaction of the *Fluids* and *Solids* upon each other, as the ſolid Parts grow ſtubborn and unyielding to the Impreſſion of the *Fluids*, ſo they loſe their Elaſticity or Faculty of Reſilition or Reſtitution, by which the Motion of the Blood it ſelf was invigorated and promoted; and by this Rigidity of the Veſſels the *Blood* is reduced to a meer *Circulatory Motion*, ſuch as is impreſs'd by the Impulſe of the Heart only, without any Room for the Expanſive, upon which all the vital Actions depend, as much at leaſt as upon the *Progreſſive*, though both be indiſpenſably neceſſary.

But beſides this Indiſpoſition of the Veſſels, which from the *Theory* laid down unavoidably attends Age, the Humours themſelves by long Attenuation grow ſo much aſſimilated or homogeneous, that the Fermentation or neceſſary expanſive Motion is but ill maintain'd; through which Defect, together with that of the Veſſels, the Circulation it ſelf languiſhes, and all the vital Faculties gradually decay with it, till if no Accident ſupervenes to haſten Death, which a little one in theſe Circumſtances will do, Nature it ſelf fails, and they drop like over-ripe Fruit, as it were ſpontaneouſly, and of Courſe into the Grave.

This *Theory*, as little able as we are to be preciſe and exact in it, will enable us to account for more *Phænomena*, and is capable of more Improvements than any drawn from particular Humours, without any Force upon Nature, and running into Suppoſitions, not warranted by the Mechaniſm of the Body. For if it be true, it ſuggeſts a Way of preſerving our ſelves longer than ordinary, if regular and early Cure were taken: Of which we ſhall ſpeak larger hereafter.

Of the Nature of Fluidity, *how* Fluids *agree, and that* Blood *is like other* Fluids; *with an Account of what is known of that Liquor. From* Paxton's Specimen Phyſico-Medicum.

HAving already obſerved (ſays the Author) what a Variety of *Fluids* are naturally contained in a Humane Body, before I deſcend to treat of them in particular, it may not be improper to premiſe ſomewhat of their Natures in general.

It is certain, the Fluidity of Subſtances is not founded in any Size or Shape of the conſtituent Particles, but purely and only in their continued Motion, by reaſon Bodies are not denominated *Fluids* from any Qualities, Powers or Operations, but from the continued Motion, and Want of Union of their Parts; for whenſoever that Motion ceaſes, and the Particles unite or adhere, they loſe their Denomination. This continued Motion of the Particles of a *Fluid* muſt naturally produce a Variety of Changes and Alterations in the Qualities of ſuch *Fluids*, that conſiſt of Particles different in Size, unlike in Figure, and unequal in Motion; becauſe Particles that bear no Similitude to each other, promiſcuouſly moving and roving, muſt neceſſarily, by reaſon of their Unlikeneſs, meet, ſtrike, juſtle and hinder each other; by which their Motions or Determinations being alter'd, the Poſitions and Habitudes they bear to each other change, and of Conſequence the Qualities, that are only the Effects of ſuch Habitudes and Poſitions. It is from this Reaſon that all the *Juices* expreſs'd from Plants or Fruits, all ſtrong Infuſions, all new Worts or Beer, all Cyders, Perry, and new Wines, which plainly, even to the naked Eye, betray the Diverſity of their Parts manifeſtly, altho' gradually, change all their Qualities; for from being turbid and opack, they become clear and tranſparent; from being ſweet and nauſeous, they grow pleaſant and delicious; from being flat and heavy, they ariſe to be light and ſpirituous. However, they evidently alter, although not always to the Pleaſure and Advantage of our Senſes, in all their Qualities.

Whereas *Fluids* conſiſting of *homogeneous* and uniform Parts, cannot undergo ſuch Changes, by reaſon notwithſtanding ſuch Particles continually move and change Places, yet being equal and uniform, that Motion produces no ſenſible Variation in the Texture of the Liquor; and from hence it is, that the more uniform and homogeneous the Parts of a *Fluid* are, the longer it continues without a ſenſible Alteration in its Qualities, as may be obſerved in *Quickſilver*, in divers diſtilled *Oils*, *Waters*, *Spirits*, &c. in *Wines*, *Beers*, and other ſtrong Liquors, after they are perfectly fined.

This Conſideration of the inteſtine Motion of the Particles of all *Fluids*, will eaſily let us into the Myſtery of that Action or Operation of Liquors that is termed their Fermentation; for that Term is uſed to denote ſome as yet unexplained Power, that is ſuppoſed to reſide in ſome Liquors, by which they alter their Natures, and for the moſt part defalcate and refine themſelves, which in Truth appears to be no more than what we in *plain Engliſh* call the *Working of the Liquor*; and all ſuch Liquors that are experienced to have a Tendency to alter their Qualities, are termed *Fermentative Liquors*: But although the Word is orderly confined to ſignify ſuch Liquors only as are daily obſerved to undergo Changes, *viz.* ſuch as *Beer*, *Ale*, *Cyder*, ſome *Wines*, &c. yet it is plain, it may with equal Reaſon be extended to all Liquors that are not entirely *uniform* and *homogeneous*, by reaſon all ſuch are prepared

red to undergo the ſame or like Changes, hough not being ſo much in Uſe, they not ſo much obſerv'd; for that Action Operation that in the above-recited we gnify with the Title of *Fermentation*, is not y Thing different or diſtinct from that otion that is inſeparable from the Partiles of all *Fluids*, but is really that very Moon which only acquires this new Denomiion when it becomes viſible; for by the eans of this Motion, ſuch Parts in Liquors at have the ſame Tendency, the ſame Size, e ſame Figure, muſt neceſſarily congregate d herd together, becauſe they agree in every ing; whilſt others in the ſame Liquor, at are neither under the ſame Degrees of otion, nor have the ſame Determinations, or the like Magnitudes, nor Shapes, muſt naturally be drove out and expelled, beuſe they thus differ in every Thing: And this inteſtine Motion in ſuch heterogeous Liquors is call'd their *Deſpumation*, ſo is Deſpumation, which is only the Sepation or Expulſion of the groſs, unlike and ſagreeable Parts, always may be obſerved ſucceed according to the different Degrees Motion in the minute Parts of the Liuor.

Such *Fluids*, which, by reaſon of the riskneſs of the Motion of their minute arts, do uſually (in no very long Time) rene or deſpumate themſelves, do very frenently acquire a manifeſt Degree of Heat, hich gradually vaniſhes as the Liquor fines, ut may be continued by a frequent Affuon of freſh unrefined Liquor; and this bſervation perhaps may yield us no improble Hints for the natural Reaſon of the ontinuance of that Warmth that is congeite to the Blood of Animals. However, aving that, I am inclined to think, from a ue Conſideration of the certain Nature of *luidity*, and from Obſervations made upon veral particular Bodies, that there are but w Liquors but will ſooner or later undero ſome Change by the Means of this Moion, that is, but will throw off ſome Parts hat are not preciſely uniform, and thereby ndergo Changes in their Qualities; I ſay ot all, becauſe *Quickſilver*, and ſome Bodies rawn by Diſtillation, ſeem to admit of an xception. The pureſt Water will, if kept, lainly diſcover ſome diſſimilar Particles lurking in its Chryſtalline Boſom, which, before they can be entirely divorced, will ſo taint and ſtain that harmleſs and Virgin Liquor, as to make it loathſome to the Smell, and ungrateful to the Palate. It is true, theſe Changes in Liquors conſiſting of moſt uniform Parts, appear comparatively ſo very inconſiderable as to paſs often unobſerv'd.

It may perhaps be thought, that what I have here ſaid of the general Nature of *Fluids* can be to little Purpoſe, ſince I have already declared, that the principal Deſign herein is to enquire into the Nature of Diſeaſes, which can relate to ſuch only that are contained in our own Bodies, which are widely different in moſt of their Qualities, not only from thoſe I have inſtanced in, but from all others that exiſt without an animated Body; and eſpecially when I have already proved, that we have no Means whereby to learn the Natures of particular Subſtances, but by applying our ſelves to ſuch for our Information. To which I anſwer, That altho' I acknowledge we can have no Certainty of the Natures of Corporeal Beings without Revelation, but as we are taught from them who are only able to reveal their own Natures, yet Analogy in ſuch Things that are without the Reach of our Senſes, is the only Means we have to regulate our Gueſſes; and in the preſent Caſe, I have only us'd Inſtances for ſuch Ends as meerly reſpect that Part only of the Nature of *Fluids* which is common to all ſuch as are ſeated in our Bodies, as well as ſuch as are without it; for as to other Qualities, Powers, Efficacies, Actions or Operations, which are many and great, wherein there appears no Agreement, I pretend not by ſuch ſo much as to illuſtrate.

But the better to explain what I mean, it will be convenient to remind my Reader, that there are always contained in the Body of Man common and appropriate Juices, and that of the firſt of theſe there are two Sorts, *viz. Blood*, and *Spirits*; and that the Blood is the Source, from whence not only all the appropriate Juices, but even the Spirits, are ſeparated. In order then to ſhew that what hath been here ſaid is applicable to what I deſign, it is incumbent upon me to prove, that the *Fluids* within us do in ſome Things agree with thoſe without us; and that the Blood,

Blood, like ſome of them, is compounded and made up of very differing, diſſimilar and unlike Parts, and therefore is naturally fermenting, that is, endeavouring, by the *inteſtine Motion* of its minute Parts, to purify and deſpumate it ſelf; that is, the homogeneous and uniform Parts do naturally tend to congregate and come together, and by that repel and drive out the *heterogeneous* and unlike, which will appear ſeveral Ways.

Firſt, In that it is daily made and continually ſupply'd by particular Subſtances we eat and drink, which partake of very different Qualities.

Secondly, By the great Variety of proper Juices ſeparated from it.

Thirdly, By its yielding Nouriſhment, mediately or immediately, to ſo many unlike conſiſtent Parts.

Fourthly, And certainly from the immediate Conſideration of it, when drawn out of its own Veſſels, and nakedly expoſed to our Examination; for then it ſoon ſo far diſcloſes its Nature, as to diſcover to the unaſſiſted Eye, that it conſiſts of Parts that are not uniform or homogeneous, by reaſon ſome of them readily part, and plainly diſcloſe their unlike Qualities in different Colours and Conſiſtencies.

And as the Blood is compounded of diſſimilar Parts, ſo it is naturally warm, and this Heat may be increaſed by ſuch Subſtances, as being received into the Stomach, do from thence paſs into the Blood. I need not produce many Inſtances to confirm what every Man's Experience will teach him, that ſtrong and vinous Liquors will warm; and as the Blood may be præternaturally heated by what we eat and drink, ſo it ſeems not altogether improbable, but that its natural Heat may be preſerved that Way; and what ſeems to confirm this Conjecture, is, that its Heat by Abſtinence is uſually abated.

However, this is certain, as the Blood is compounded of very differing Parts, ſo it is always, by the Help of the *Secretory Veſſels*, purging and purifying it ſelf: For notwithſtanding ſome of the Separations made from the Blood are really neceſſary to the Life of the Animal, as appears particularly evident by the Secretion of Spirits made by the Brain; yet if we conſider the Blood as a natural Subſtance, and ſo acting by the ſame Laws as other natural Beings do, we muſt conclude, that all ſuch Separations do proceed from the Mechanical Affections of the Blood, and are therefore thrown out of the Maſs by the Help of theſe Veſſels, becauſe they are not homogeneous to it; ſo that the Blood really fines and purifies it ſelf, notwithſtanding the Life of the Animal could not be continued, unleſs the Blood did make theſe Separations.

By theſe Obſervations, it appears that the Blood agrees with other *Fluids* of diſſimilar Parts, in that, like ſome of them, it heats, and like all of them, it purges, purifies or fines it ſelf; that is, that it naturally parts, ſeparates or divides from ſome diſagreeing Parts by Means of the *Secretory Veſſels*. But in the Continuance and Manner of doing this, it differs extremely from other *Fluids*; for its Native Heat is as laſting as the Animal Life, although not always equal, and its Deſpumation is by the *Secretory Veſſels*; becauſe not being like other Liquors left to it ſelf to proceed in its own Way, by reaſon it is perpetually whirled about by the *Circulatory Motion*, nor not being contained in Veſſels capacious enough to fine it ſelf, as they do, it can only perform it by theſe Veſſels. As to what perhaps may be made an Objection by ſome, that Heat is not eſſential to Life, nor to the *Blood*, or at leaſt to that *Juice* that is analogous to *Blood*, as appears by what we may obſerve in exſanguine Creatures, ſeems to me to carry no Weight; for Heat, if conſider'd as a ſenſible Quality, only bears a Relation to our Senſes; but if conſider'd Phyſically in the Subject, is only *Motion*; ſo that no *Fluid* can be abſolutely cold, that is, depriv'd of all internal *Motion*. Beſides, we may obſerve ſeveral Liquors to fine themſelves; where there is no Perception of Heat, and where they are contained but in ſmall Quality, it is ſeldom felt.

Health, (ſays the ſame Author) the more I conſider it, the leſs I underſtand to define it, which brings into my Mind that Saying of one of the Fathers, although ſpoke upon a very different Occaſion, *Si Nemo ex me quærat, ſcio; ſi Quærenti explicare velim, ne-*

ſcio.

Every one's own Experience will in-
n what Health is, and his Complaints
l declare to others what it is not. Some-
ng it is that we always lament when we
nt, and yet do not value when we enjoy.
its Abſence it is prized as the greateſt of
ſſings, valued as a Heaven here below, or
Earthly Paradiſe; without it even Life
contemned, and Death deſired, becauſe
live then is but Pain, and to move is but
ſery.

Sickneſs or Diſeaſes are but the Reverſe to
alth, and are only ſome unnatural Chan-
in the Body of Man; for when a Man
ſick, diſeaſed, diſorder'd in Pain, or any
ays ill affected, it is certain he is alter'd
d chang'd from what he was in Health,
cauſe he is not then as he was before; and
Changes and Alterations, whether in
r own, or in other Bodies, if naturally
formed, are by *Fluids*, by reaſon a con-
ent Body, as ſuch, muſt unalterably re-
in in a ſettled State, unleſs it is alter'd or
elter'd by a *Fluid*.

But becauſe there is a Variety of *Fluids* in
Humane Body, there may be ſome Diffi-
lty to diſcover in which Diſeaſes lodge,
leſs we firſt enquire into their Natures.
is certain, ſome Diſeaſes are as diffuſive
our Bodies, there being no Part that is
empt from their Tyranny; and ſuch there-
re require a Subject as extenſive, and are
erefore derived from one of the *common*
uids; whilſt others are of a narrower Com-
ſs, being limited to a particular Region,
d ſo are either produced by ſome præter-
tural Separation depoſited in ſuch Part, or
ſome Fault in an appropriate Juice. How-
er, ſince all Juices, whether natural or
æternatural, are derived from the Blood,
ſhall treat of it, as being in Nature prior,
efore I examine into them.

But by reaſon the other *common Fluid*, the
pirits, ſeem to be diffuſed equally through-
ut the whole Man, there may be ſome Dif-
iculty to diſcover from which of theſe two
ome of theſe general Diſeaſes do proceed,
nleſs we can firſt eſtabliſh a *Criterion* where-
y to diſtinguiſh between them. To do this,
we muſt have Recourſe to Experience and
Obſervations, for it is from them only we
an be inform'd; and by them we are
lainly taught, that all *natural* and *præter-*

natural Separations, the Repair of all the ſolid and conſiſtent Parts, all natural and præternatural Heat, are ſome Ways derived from, or appertain to, the Blood; and that the Spirits are the only Inſtruments of all *Senſation* and *Organical Motion*. Theſe are Truths now ſo univerſally known, that I think it ſuperfluous to go about prolixly to prove them; wherefore I ſhall briefly offer but theſe two general Obſervations: Firſt, If the *Blood* be but hindred from paſſing into any particular Part, all thoſe above-named Effects which I have obſerved to be derived from the *Blood*, will be there entirely deſtroy'd: And if the Paſſage of the Spirits into a Member is but intercepted, their proper Offices of *Senſation* and *Organical Motion* are immediately loſt.

But firſt of the *Blood*, which hath been already ſhew'd to be compounded of different and unlike Parts, to be the Fountain from whence the other Juices are deriv'd, to have two Kinds of Motion, and to be contained in its own proper Veſſels. It remains now that we enquire what further is to be known of the Nature and Uſes of the *Blood* ſo long as it was in our Veins. It is very evident, ſo long as all the Parts of our Bodies regularly perform their ſeveral *Offices*, *Functions* and *Operations*, we enjoy an abſolute and entire *Health*, *Health* being only a Term to ſignify the joint Performance of the Duty of every Part for the Benefit and Safety of the whole; for whenſoever the *Uſes* or *Functions* of the *Parts* are impair'd or injur'd, the Body is ſaid to be *ſick*; and whenſoever entirely deſtroy'd, *dead*: And as all Parts of the Body conſpire and cooperate in their ſeveral Ways for the Good of the whole, ſo any Part failing in its Duty, the whole ſuffers; however, the Part that is deficient, is only ſaid to be diſeaſed. But notwithſtanding every Part of our Bodies hath its proper Uſe, yet all are not equally uſeful for continuing Life to the whole. The *Blood* is a Part ſo entirely uſeful, that Life cannot be continued without it, and whenſoever this neceſſary Portion of our Bodies alters and fails in its Offices, our Healths immediately impair. But notwithſtanding the Health of our Bodies thus ſuffers by the Fault of the *Blood*, yet that Faultineſs appears only to us by the Means of its Functions and Uſes:

When-

whenſoever then the *Blood* rightly performs all its Offices, it is certain the *Blood* then is good, becauſe the Man is well, the Goodneſs of the *Blood* being only a Relation to the Health of the Man. This Conſideration, methinks, alone ſhews the Vanity of that Uſage of judging of the Purity or Goodneſs of the Blood, by its Colour, Taſt or Conſiſtency, after Veneſection, becauſe then the Relation betweeen that *Blood* and the Man is ceaſed: For notwithſtanding we may judge of the Goodneſs of the Blood by the Health of the Man, yet we cannot of the Health of the Man, by the Means of his detracted Blood.

The Diſeaſes of the *Blood* appear by the Vices and Faults of its *Functions*, *Uſes* and *Operations*; for the *Blood* it ſelf is contain'd and included in its own proper Veſſels, and they are buried and cover'd with the common Teguments of the Body; ſo that theſe Veſſels and Coverings interpoſing, exclude us from any immediate Knowledge of this *Fluid*, ſo long as it is thus contain'd, unleſs what can be communicated by the Means of ſuch Veſſels and Coverings, which can be but ſmall, by reaſon ſuch interpoſing *Parts are croſs'd and opacous*, and are only ſubject to the Examination of one *Senſe*, viz. That of *Touching* and *Feeling*; wherefore all the Knowledge we can obtain, of the State or Qualities of the *Blood*, during its Continuance in our Veins, only extend to ſuch Things as are diſcoverable by this Senſe; and that can only relate to the Two differing Motions of the *Blood*, the one of which diſcern'd by the Púlſe, the other by the Heat; for it is evident there is nothing elſe, whilſt it is in our Bodies, that can directly fall under our Examination. And in the due obſerving, conſidering, weighing and comparing theſe Two Things, *viz. The Motions of the Blood, diſcover'd by our Fingers, and its Separations by our other Faculties*; how they are in that State we call Natural and Healthful, with how they are in an unnatural and unhealthy one, with the ſeveral Circumſtances attending theſe, conſiſts all the Knowledge we can have of the *Blood*, and all the Changes and Diſeaſes ſeated there.

But here perhaps it may not be improper to obviate an Objection that may be made, *viz.* That although it hath been prov'd, that there is a *Motion* amongſt the minute Parts of a *Fluid*, and that there is ſuch an one in the *Blood* it ſelf, after the *Circulation* is ceaſed, and that therefore it is reaſonable to conclude, that there is ſuch an one during the *Circulation*, yet that hath not been particularly prov'd. To remove then all Pretences to ſuch an Objection, I ſhall directly ſhew there is ſuch a Motion Three ſeveral Ways:

Firſt, By its Heat.

Secondly, By its Inequality in Separation.

And *Thirdly*, and more immediately, from the Conſideration of it when flowing out of its own Veſſels, and received into another.

It is certain, our *Blood*, whilſt it runs in our Veins, is always warm, and it is as certain that Heat is only Motion; Bodies being hot or cold, as their Particles are more or leſs moved, and the *Blood* being warm, its Particles muſt therefore be in *Motion*. By the Second it is evident, becauſe the ordinary Secretions neither regularly anſwer to the Quantities or Qualities of what we eat or drink, nor to the Degrees of Motion in the Circulation, and therefore cannot directly depend upon either; and if therefore not upon theſe, they naturally muſt upon ſome Motion of the Parts, becauſe no Alterations can be conceived in a natural Subſtance, but by ſome Motion. By the Third, this Motion appears even *ad Oculum*; becauſe in Emiſſion it ſtreams out in divided Parts, and the uniform and homogeneous run together, which they could not do without Motion; and this Motion either muſt have been antecedently in them, or muſt have been acquir'd by their Emiſſion; but it could not be the laſt, becauſe by that they loſe their *Motion*, in that they grow cold, and therefore muſt have been in them while running in our Veins.

Theſe Obſervations make it manifeſt, that there is *de facto* amongſt the Parts of the *Blood*, different and diſtinct from that of the *Circulation*. Theſe Things thus premiſed, it will follow, ſo long as the *Blood* in Circulation is whirl'd about in its proper Conduits, by an equal and natural Motion to all

all Parts of the whole Body; and ſo long as it is by a gentle and eaſy Agitation of its minute Parts, ſo diſpoſed to ſupply the ſeveral Veſſels adapted for Separation, with their particular Juices, and all others with Nouriſhment. So long the Secretory Veſſels will perform their Offices, and the ſolid Parts will be repair'd: And ſo long as theſe are thus regularly perform'd, ſo long it is apprehended there can be no diſcernable Alterations in the *Blood*, and of Conſequence no Diſeaſe to be obſerv'd there.

The *Blood* I conceive then hath been already prov'd a *Fluid* compounded of very different and unlike Parts; that it is conſtantly moving, hourly ſeparating, and daily receiving freſh Supplies; but as to any of its Properties, Powers, ſecondary or ſenſible Qualities, it being ſo included in the conſiſtent Organical Parts, that it cannot immediately operate upon us; we muſt, as I ſuppoſe, without Revelation for ever remain in ſettled Ignorance. But there being ſeveral Symptoms complained of in the Body of Man, that ſeem to be deriv'd from ſome Change in the *Blood*, which cannot be diſcover'd by either of the Two formerly mentioned Ways, I mean its *Motions* or its *Separations*, it will behove me to examine what they are, or how they can be effected; for theſe conſiſting in ſuch Affections as are not outwardly to be diſcover'd by us, can be only learnt from the Information of the Diſeaſed; and may be comprehended under what we call either Pains, Sickneſs, Uneaſineſs, Faintings or Weakneſs, and their ſeveral Degrees: Theſe I take to be the principal Symptoms that may be ſome Way cauſed by the Blood, and can only be taken from the Mouth of the affected Perſon. And yet even theſe, although they may be cauſed by the Faults in the *Blood*, yet the Diſeaſed only perceives them by the Help of the Nerves; for the *Blood* being vitiated, and ſo alter'd, muſt of Courſe differently affect the Nerves in its Circulation; by which the Spirits being diſturbed, uneaſy Perceptions are produced, which are diſtinguiſh'd by theſe Names: However, the Underſtanding knows nothing of the Cauſes by which theſe Perceptions are excited, and therefore cannot communicate what it doth not know.

By what hath been ſaid it may be concluded, that we can know nothing of the Nature, Properties, ſecondary or ſenſible Qualities of the *Blood*, or of any Separations from it, made and lodged in the Body, by any Information from others, or by any View taken by our ſelves, of what is made or perform'd in our own Bodies.

I ſhall proceed now to examine what we can in particular know by its Motions and Separations. The Motions, as I have prov'd, are Twofold; the one of which is purely natural, as being common to all *Fluids*: It is not my Buſineſs to enquire into the Cauſes of this, it being ſufficient to my Purpoſe that it is ſo; by the Means of this, if left to its ſelf undiſturb'd, it will part and divide into ſuch Parts as ſeems agreeable among themſelves, although unlike to each other; as is manifeſt, when extracted out of our Veins, in that it gradually runs into *Serum*, and more conſiſtent Parts. The other is its Circulatory or Animal Motion, in which it ſeems only paſſive, being impell'd and drove about the Body by the Motions of the *Heart* and *Veſſels*; and this is probable what preſerves it in its genuine *Mixture* and *Craſis*, by reaſon when it is removed out of the Power of this Motion, it ſoon breaks, parts and divides, the ſimilar and agreeable Parts herding and aſſociating together by vertue of their own natural Motion; whereas by this it is hindered from ſo dividing, and preſerved in one continued Maſs; for the *Blood*, being made out of different Subſtances, and its Parts continually moving, would naturally, if left to it ſelf, run into different Parts: And therefore the Mixture and Union of its Parts, are in proportion to the Quickneſs or Slowneſs of its Circulation; for which Reaſon it is, that the more vehement it circulates, the leſs it ſeparates, and the ſlower it moves the more: And it is from this Reaſon that fainting and expiring Perſons ſo frequently fall into Colliquative Sweats.

But notwithſtanding ſo very differing Effects ariſe from theſe Two Motions of the *Blood*, as that its Mixture is to be preſerved by one, and injured by the other; yet there is a Sort of Conſent and Agreement between them for the preſerving Life: For if the Natural Motion encreaſes, by which the

Craſis would be endanger'd, the Animal one is by that very Encreaſe awakened; and the *Circulation* is intended, whereby the Miſchiefs from the firſt are prevented, and as the Animal one is encreaſed, the Effects of the other are leſſen'd. However, this I think every one may by Experience learn, that there is a Sort of Harmony, Conſent or Agreement, between theſe Two Motions, they mutually depending upon each other; for the *Animal* or *Circulatory* Motion intended by the Natural one, as appears in that the *Pulſe* will be affected by any Commotion in the *Blood*, and may be obſerved to be encreaſed upon the Admiſſion of the Alimentary Juices into it; and the Natural muſt be conſtantly affected by the Animal one, as being diſturbed by its continued Progreſſion.

But by reaſon the *Circulation* of the *Blood* is perform'd by an *Impulſe*, it receives from the Organical Parts, *viz.* The Heart and Arteries, whoſe Motions are not under the Guidance or Government of the Mind: It may perhaps be ſuſpected by ſome, that ſuch are uncapable of being ſolicited into unnatural Motions, by reaſon they can perceive nothing of ſuch an Irritation; beſides, they ſeeming to depend upon the Mechaniſm or Diſpoſition of the *Parts*, actuated only by conſtant Influx of Spirits, they muſt be as that is. I need not produce many Obſervations to remove this Objection, ſince it is ſo obvious in Purging and Vomiting, that ſeveral Parts of our Bodies may be irritated into Motion without our Knowledge; and in Truth, all the Organs of our Bodies, whoſe Motions immediately contribute to Life, are always ſo moved; but what more particularly anſwers this, that the *Pulſe* always encreaſes upon the Reception of the *Alimentary Juices* into the *Blood*, as every one may experience, by obſerving it a due Time after Meals.

The *Blood*, notwithſtanding its *Craſis*, is preſerved by the *Circulation*, yet it is not by that hindered from defending it ſelf by the *Secretory Veſſels*, which are ſo placed and faſhion'd as to receive the ſuperfluous and unneceſſary Parts, whenſoever ſuch are befitted to paſs through thoſe Ducts; and when they are not, they are ſometimes thrown upon other Parts. When the *Blood* thus refines it ſelf by the *Secretory Veſſels*, which are by nature prepared for that Purpoſe, its Performance is Natural; but when by other Ways, preternatural. The firſt are for the Advantage and Safety of the Body, the laſt uſually the Effect of diſorder'd *Blood*; both afford us ſome Helps to judge of the Condition of the Source from whence they flow.

By what hath been obſerved, I think it is evident, that the *Blood* is a *Heterogeneous* Body, and that its Parts are in perpetual Fluxion, and that it inceſſantly moves forwards in its proper Conduits; and that all the Knowledge we are capable of having of its different Conditions, is only by the Means of its *Motions* and *Separations*; and that the Separations in great Meaſure depend upon the Circulatory Motion: Such for the moſt Part encreaſing and leſſening in ſome Proportion, as that Motion leſſens or intends, ſo that the natural and healthful State of *Blood* ſeems to conſiſt in a Mean between Two Extreams; in one of which its regular Separations are hindered by the Violence of its Progreſſion; in the other, they are enlarged by the Remiſneſs of it.

Of

Of the Blood, with ſeveral Experiments made thereupon, by boiling; the Addition of ſeveral mix'd Bodies, by the Microſcope and Chimical Analyſis. From Phil. Verheyen, *&c.*

SEveral Authors diſtinguiſh the *Blood* into what is ſtrictly ſo called, and what is meant at large; by the *Blood* in the extenſive Senſe, they mean the whole Maſs, or that *Fluid* in general, as it flows in the *Blood Veſſels:* Hence they divide it into the *Blood* ſtrictly ſo called, the *Nutritious Bile*, *Pituit* and *Melancholy Aliment*. The *Blood* in a confin'd Senſe, is that red Portion of the *Sanguineous* Maſs, temperately hot and moiſt; the *Nutritious Bile*, is a thinner Part of the Maſs of *Blood*, temperately hot and dry; the *Pituit*, is a whiter and cruder Part of the Sanguineous Maſs, temperately cold and moiſt; the *Nutritious Melancholy* is a blacker Part, more groſs, and of an Earthy Subſtance, temperately cold and moiſt; they likewiſe call the *Bile*, *Pituit* and *Melancholy*, *Alimentary*, to diſtinguiſh them from an Excrementitious Humour of the ſame Denomination; to wit, from the *Bile* or *Gall*, collected in the *Liver*, which is called *Excrementitious*, from the *Mucus* or *Snot* in the Noſe, *Inteſtines*, and other Parts, from the *Spittle* and that black Juice ſecreted in the *Spleen*, and that black Liquor in the *Renes Succenturiati*, which ſome call *Excrementitious Melancholy*.

As to the *Blood*, the natural Redneſs that appears in it, ſeems chiefly to depend on the Advantage of Reſpiration, from an airy Subſtance tranſmitted into that Maſs through the Arteries, taken its Origine from the left Ventricle of the Heart; from whence, by the *Arteria Pulmonaria* in the Lungs, it derives its rubicund Colour, it being of a darker and black Tincture in the Right Ventricle, but paſſing through the Lungs it obtains that ſplendid Redneſs; as is further proved in treating of the Uſe of Reſpiration: Furthermore, that *Blood* being drawn from the extream Parts, grows black, when expoſed to the freſh Air, it ſenſibly changes its Colour into a more florid Red, and that more or leſs, ſooner or later, according as the Blood is more or leſs ſubject to receive it, and the *Air* more impregnated with Matter, apt to ſtrike ſuch a *Tincture*. And if the *Blood*, when it is drawn from the Body, be ſtirred with a Stick, ſo that the whole Subſtance of it be equally expoſed to the *Air*, there will appear no Blackneſs amongſt it, but the whole Maſs will be red, as well as that particular Part of it, ſtrictly called *Blood*.

Our *Surgeons*, when they ſee the Blood that is taken from the Body black, commonly pronounce it to be *Aduſt*, nor that without ſome Show of Reaſon; ſince we obſerve not only Wood, but ſeveral other ſolid Bodies grow black with burning, but likewiſe Liquids, by a conſtant and ſtrong Boiling; as appears in Malt Liquors, and the Decoctions of moſt Herbs, and in the artificial boiling of *Blood*: From whence we may ſuppoſe the Blood in a living Body, through too intenſe a Heat, as for Example, in a burning Fever contracts its Blackneſs; in the mean Time, it is not a certain Sign that black Blood is aduſt, from what will hereafter follow, becauſe the Blood will receive a Blackneſs from the Mixture of Spirit of *Vitriol*, and other Things of the like Nature.

It is not therefore the making Power in thoſe Four Humours, as they are ſaid to conſtitute the Sanguineous Maſs, but it is better to conſider the more ſubtile and groſs, the more volatile and fix'd Parts in the ſame Maſs, as they are more or leſs concocted, ſulphureous, ſaline, watry and earthy, and

therefore more fluid or ſolid, alimentary or excrementitious, or more adapted to the Generation of Seed, or other Uſes; and that either limpid or tinged with a White, Red, Black or Yellow, Colour. From hence we are apt to call the *Blood*, when of a Yellow Tincture, *Bilious*, whether the Matter tinged with that Yellowneſs be *nutritious* or *excrementitious*: By the ſame Reaſon, the Maſs, when it appears crude and not much tinctured, ſuch as is met with in *Cachectical Patients*, is uſually called *Pituitous*. So Perſons, whoſe Blood is equally mix'd, are ſaid to be temperately *Melancholy*, *Bilious* or *Pituitous*, and thoſe whoſe *Blood* is very red, are called *Sanguine*. The Blood when drawn from the Vein and cooled in the Receiver, plainly ſeparates into Two Parts; to wit, into thick, coagulated and fluid Parts; this, except it recedes much from its natural State, is of a high Colour, firſt Black, then Red, and ſometimes covered with a whitiſh Skin or Cruſt, that is tough and like Size; the other Part is *fluid* and limpid, frequently of a yellowiſh Colour, or a little tinged with Red: Hence this is by ſome called the Serous Parts, and by others, the *Serum* of the Blood, though it differs much from pure *Serum*, as the ſeveral *Trials* hereafter will demonſtrate.

If the *Blood* freſh drawn from a Vein be ſhaked in the Veſſel, or ſtirred with a Stick, it does no only gain entirely a Red Colour, as was hinted before, but it preſerves it longer *fluid*; neither does it eaſily ſeparate into Two Parts, like that which is kept ſtill from the firſt Extraction; from whence it is manifeſt, that the airy Particles does not only augment the Redneſs of the *Blood*, but the Coagulation thereof, notwithſtanding the conſtant Fluidity thereof, cannot be reaſonably aſcribed to the Agitation, ſince undoubtedly that is greater in the Body, and the Particles more perfectly mix'd by the natural Motion than that artificial Shaking, and yet when the Motion ceaſes it preſently coagulates.

The *Blood*, though it remains *fluid* by a ſlight Boiling, grows thick by intenſe Heat, and requires a brown Colour, like that of the *Liver* boil'd, though it be continually agitated while it is heating; from whence we may ſuſpect the ſame Thing happens in a living Subject through intenſe Heat, as in a *Burning Fever*, &c. So that it is not capable of being reduced to its natural State, or be able to ſupport Life.

The more ſerous Part likewiſe grows thicker by boiling, which of its own Accord ſeparates or divides it ſelf from the groſſer Part in the Receptacle, and acquires a Conſiſtence and Colour almoſt like the White of an Egg, by a moderate Degree of boiling: From whence we gather, that that Part is not altogether ſo ſerous as it appears to the Eye, and is commonly ſuppoſed, but that the greateſt Part of it is nutritious or alimentary.

The *Blood* is coagulated by the Addition of an *Acid*, even in living Bodies, as hath been proved by Injections, and admits of various Colours, according to thoſe that are caſt into it: Hence, by the Addition of Spirit of *Nitre*, it becomes of a darkiſh White, by that of Spirit of *Vitriol*, it grows Black, according to the Strength of the *Acid*, but leſs intenſely; by the Addition of Spirit of Salt it acquires a mix'd Colour, betwixt that of Spirit of *Vitriol* and Spirit of *Nitre*; to wit, a little inclinable to an Aſh-coloured Yellow; by putting in Salt of *Lead*, the *Blood* grows thicker and paler, but not ſo pale but that the Red prevails; *Vitriol* makes the *Blood* of a dark, dirty Aſh-colour; but Salt of Iron or Steel changes the Colour much leſs: *Sea Salt* and *Nitre* makes a dark colour'd Blood much redder, and in ſome Meaſure hinders the Coagulation; ſo Alkalious Salts perform the ſame more efficaciouſly.

I expoſed ſome *Blood* that was made Black by the Addition of Spirit of *Vitriol*, together with ſome that lay in the Bottom of a Baſon, and was grown Black for want of Air; the Surface of this laſt turn'd Red in about an Hour's Time, but the former held its Colour ſeveral Days. And becauſe Alkalious Salts deſtroy *Acidity*, therefore I had a Mind to try whether they would turn the Black Colour Red again, and accordingly upon the Spirit of *Vitriol* that had blackened the Blood, I poured ſome Liquor of fix'd *Nitre*, but without any remarkable Effect, though the exceeding Blackneſs went off a little, but there ſucceeded a Colour that was rather Greyiſh than Red.

From

rom theſe and the like Trials, for I made bundance, we learn not preſently to infer, hat becauſe the *Blood* is Black, therefore it aduſt, or becauſe it is White or Pale, herefore it is *crude*, ſince the Humours reternaturally various are produced from arious Cauſes; neither does it appear that hey are not like, which emulate the Nature r Spirit of *Nitre* or *Vitriol*.

We may learn from theſe Experiments, hat though *Acids* agree in this, that they oagulate the Blood, yet they produce other ifferent Effects that are very oppoſite to ach other; for the *Blood*, as ſaid before, hat is tinged Black with Spirit of *Vitriol*, made White by Spirit of *Nitre*; neither it to be doubted but thoſe Things which ive a great Alteration to the Colour, alſo ive another Turn to, or much alter the *Craſis* f the Blood; therefore I think, that thoſe hings which powerfully change the Coour and Conſiſtency ought cautiouſly to be ade uſe of, although they may be reckon'd mongſt the Salubrious Medicines; for tho' ey may be adminiſtred, they ought not to e given with that Liberty: Therefore from ence we may obſerve, that where the *Blood* too Black, to abſtain from Spirit of *Vi-iol*; and if any *Acid* is proper to be adiniſtred, that we rather make uſe of Spit of Salt, or *Nitre*.

Neither is the *Blood* only liable to theſe hanges, but likewiſe that more *fluid*, *limd* and *glutinous* Part, called the *Serum* of e *Blood*, which admits of different Cours and Conſiſtency from the Addition of fferent Bodies; for if to that Part we ix Spirit of *Nitre* or *Alum*, either burnt crude, it turns to a White Curd, but ſier by the bare Addition of *Alum*, which akes the Curd harder and tougher; but if be much ting'd, it will not be ſo white: he ſame Thing happens by the Addition of *lt of Lead*, but much more imperfect, beuſe the Whiteneſs is muddier, neither is e Maſs ſo thick, and the Precipitation is icker. Spirit of Salt does not coagulate curdle this *Fluid*, but makes it more limd, at leaſt when the Maſs, as it commonhappens, is ting'd with Red; for it deoys their Colour, and ſcarce procures any er obſervable Change. Spirit of *Vitriol* kes the tinging Particles much blacker.

I made theſe Trials with Ox's *Blood*, which I had ready at Hand; but afterwards I made Experiments upon the *Blood* of Men who were in a reaſonable State of Health, in which I obſerv'd no great Alterations, only that the Red Part did not grow ſo Black upon the Addition of the Spirit of Vitriol, and became leſs white with that of Spirit of *Nitre*; and ſo of the reſt. I got that Part of Humane *Blood* called the *Serum*, that was pure, and not the leaſt Redneſs in it, but a little yellow Tincture; this by gentle boiling acquired a white Colour, and the Conſiſtency of the White of an Egg almoſt hard boil'd; this would curdle by pouring upon it Alum, and grow Milky by the Addition of Spirit of Nitre, but would not become ſo thick, as the like Part of the Blood of an Ox. I imputed this leſſer Change of the Humane Blood to proceed from the greater Seroſity thereof, and the leſs abounding of Nutriment, for the Ox's Blood was taken from lean Beaſts; for while they feed they eat much, but are not uſed to drink ſo much Liquor. Hence I made a Trial on my own *Blood*, and obſerved the Alterations to be the ſame as that in the Blood of others.

Theſe Things premiſed, we ſhall proceed in the Deſcription of the Changes I obſerv'd in the Blood of ſeveral Men and Beaſts. Vinegar darken'd ſeveral colouring Particles but weaker than Spirit of *Vitriol*; of the others it made no Change; *Sea Salt* and *Nitre* change not only the tinging Particles, that are darker, become more ſhining, but that is ſo ſmall, 'tis but viſible in few; the fixed Alkalious Salts ſcarcely make any Alteration; *Blue Vitriol* ſlightly curdles this Maſs, and gives it a whitiſh Green Colour; *Green Vitriol* only juſt diſturbs the *Fluid*, but does curdle it, and the leſs Change ariſes from the Addition of the artificial Part, which is the *Sal Chalybis*; then the *natural Vitriol*, Spirit of *Vitriol*, with *Sea Salt* or *Nitre* added to that ſerous Part, makes a white Curd, but much more perfect with *Sea Salt*.

Spirit of *Salt* or *Vitriol*, added with *Alum* to the ſame Body, hinders the Effect of the *Alum*; ſo that the Maſs, which was forced only by the *Alum* into *Curd*, is only lightly diſturbed or agitated; nay, the Coagulation made

made by the *Alum* is removed by thoſe Spirits; Spirit of *Nitre* and *Alum* perform almoſt the ſame Effect, whether added together or alone; fixed *Alkali Salts* hinder the Effect of Spirit of *Nitre*; nay, a Coagulation made by that Spirit is diſſolved by the ſame Salt, and the Maſs render'd limpid again; I have not made a Trial with the Volatiles: The Reaſon of the Coagulation ſeems to be thus.: That the Points of the Particles of *Alum*, *&c.* enter into the Pores of the Particles of the Liquor, and do as it were bind them, and ſo ſtop their Motion; but the Reaſon of the Change of Colours is not ſo eaſily given, except it be a General one; namely, That by a Mixture of various Things, their *Superficies* are variouſly chang'd or alter'd, ſo that the viſual Rays are ſometimes reflected one Way, and ſometimes another.

We ſhall next proceed to an Examination of the Particles of the *Blood*, by the Aſſiſtance of the *Microſcope*, whereby I have ſeen in a ſmall Drop of it ſeveral Kinds of Particles; for ſome will appear very long, and in ſome Meaſure pointed, like Windle Straws; others of a ſmall Extenſion, and amongſt theſe many globular or round ones; ſome of Three, Four, or more Points, or of an irregular Figure; amongſt the globular ones few are to be met withal that are perfectly Spherical, but more of them are of an Oval Figure; and others there are that give an Unevenneſs to the Superficies: But the ſaid Particles may be better view'd if the Blood be examined while it flows from the Wound, and is received into warm Water, and preſently after ſhaked; ſo will the Mixture become leſs obſcure, and the Particles of the Blood leſs intricate amongſt themſelves, ſo that they may be more exactly ſeen.

In the Part of the waſhing of the *Blood*, or in the Water which extracted the Tincture from the coagulated *Blood*, the Particles will appear very various, but in Proportion a great deal more round; but the groſſer or more fibrous Parts which are ſeen in the Blood promiſcuouſly mix'd, do not appear herein, ſince in ſuch a Lotion you have nothing but the more ſubtile Parts of the *Blood*.

In the gelatinous Part of the *Blood*, ſeparated from the reſt ſpontaneouſly in the Baſon, and from thence purified by frequent Decantations and Subſidings, and freed from the groſs and redder Part, may be perceived Particles of various Kinds, but not ſo common as the round ones in the waſhing of the Blood, neither are they ſeen ſo plain, that their Tracings may be exactly obſerv'd, which ſometimes happen in other limpid and thin Liquors.

Although from the ſaid Experiments it may ſeem to follow, that the globular Particles of the Blood contribute much to the Redneſs of its Colour. I cannot by any Means perſwade my ſelf that it depends on that only, ſince they are not leſs frequently found in *White Milk* than in *Red Blood*; and what takes away the Redneſs of the Blood, does not always take away thoſe round Particles.

In examining the *Blood* by Chymical *Analyſis*, becauſe I could not eaſily come at Humane Blood, and then only ſuch as was Diſeaſed, I took the Blood of an Ox warm from the Vein and put it into a *Cucurbit*, which I ſet into *Balneo Mariæ*. Firſt of all the Liquor came out not in great Drops like common Water, but with ſome Appearance of Striæ or Ridges; what came over was very thin and limpid, almoſt of no Taſte, and ſomething of an ungrateful Smell, but yet not properly Fœtid: The Quantity of a Spoonful of it, by adding a few Grains of *Salt* of *Lead*, would turn of a Milky Colour and Conſiſtence. From what I could gather from the ſaid Qualities was, that this was a Liquor compounded or made up of abundance of *Flegm*, *Sulphur* in a ſmall Quantity, and a little Salt. The next Liquor that ſucceeded in Diſtillation was more watry, yet produced nothing which did not turn muddy with ſomething of Whiteneſs, by putting to it Salt of *Lead*; a plain Sign it was not *Flegm*, ſince that is by no Means diſturbed or muddied by the Addition of that Salt. When I could produce nothing further by the Heat of the *Bath*, I removed the *Cucurbit* with the *Blood* into a Sand Furnace; where, giving a ſtronger Heat, I obtained further a Liquor more impregnated with a Volatile Salt and Sulphur, but tinged with an *Empyreuma* or *Burning*, expelling the more watry Humidity

I di-

distilled the rest by a *Retort* with a reverberating Fire, and from thence I drew off again another more watry Part, by a Heat not over violent; that was followed by a subtle Liquor that was very penetrating, and struck sensibly upon the Organs of Tasting and Smelling, and which was not a little efficacious in promoting Sweat; which kind of Liquor is sometimes called Spirit of Blood, from whence a volatile Salt and thick Fœtid Oil is gain'd, there remain'd in the Retort a *Caput Mortuum*, which was chiefly Earthy, and could not by any Force of the Fire be driven into the Receiver: The Salt thus raised was much more active and volatile than the Spirit, whence its Rectification is ascended first, though in the first Distillation, by reason of its intimate Union with the other Particles, it was difficultly driven over, and would not appear till after the Flegm and the greatest Part of the Spirituous Liquor was risen. I put again the *Ox's Blood* in *Balneo Mariæ*, but the Liquor that came first over was not so *Sulphureous* as in the former Process; and this must be so undoubtedly, because there was a greater Evaporation before Distillation. The Humane Blood likewise afforded me the same sort of Liquor; which I had from a Surgeon, who told me he took it from a sound Body.

But that I may examine into the Quantity and Proportion of the Chymical Elements existing in *Blood*, I took such *Blood* as I could get of a Male, that was of a grown Age, then labouring under a Defluction of Humours upon the Shoulder and Pectoral Muscles, occasion'd by a Rheumatism, of which I had Six Ounces and as many Drams: When this had stood some Hours in an open Vessel, I judged it was divested of its Spirituous Part, which in Distillation of the Ox's Blood I would not put into the *Balneo Mariæ*, but kept it digesting for some Days in Horse-Dung. That Blood being in some Measure putrified, I put into a Glass *Cucurbit*, and distilled it in Sand with a moderate Fire, till nothing would further ascend; rectifying the said Liquor, I took about Two Drams of the Spirituous Matter, which first appeared in the Distillation of the Ox's Blood, but by reason of the former Putrifaction of this Blood, it stunk egregiously, and therefore, as being nauseous, I cast it away.

When I came to wash the Receiver with Water, it presently contracted a milky Colour, which was a Sign it was very Oily; there remain'd in the *Retort* a Black Mass that was tough and compact as Pitch, which I altered with great Difficulty, and it weighed Two Ounces; this I put into a Glass *Retort* cooled, and distilled with a reverberatory Fire as long as I could see any Thing appear; in the *Retort* there remain'd a blackish Mass, something light, dry and Spongy, which taken from the *Retort*, weigh'd about Two Drams; of which, making a Lixivium with Rain-water, I was willing to try whether, after the Digestion of the Blood and violent Action of the *Retort*, any Thing of a fixed Salt remain'd, but the Vessel was broke that contained the Lixivium, by the Imprudence of a Servant, and I was disappointed of the End of my Labour: The Receiver containing a Matter after Distillation, I transferred that into Sand, serving me instead of a *Cucurbit*, and fitted a blind Alembick to it, and took about half a Dram of the purest white volatile Salt, then placing a beek'd Limbeck to it, and encreasing the Fire, there was produced a Spirituous Liquor, the *Empyreuma* smelling sweet, and was in Quantity about Two Drams and a half; the Liquor remaining after this last Distillation I put into a Filtring Paper, first wetted with Rain-water, and repeating often the Filtration I obtain'd almost Two Drams and half of Oil separated from the Flegm; and that which stuck so hard that I could not get from the Glass, I reckon weigh'd a Scruple; so that the Weight of the whole Oil might be about Eight Scruples and a half; but that Oil had an abominable Stench both to the Nose and Palate, the greatest Part being thick and black, the lesser Part something fluid and yellowish: The Weight of the Flegm, both from this and the first Distillation, was about Five Ounces and a Dram, and there was not lost above Two Drams in the whole Distillation.

If from hence therefore I may be allow'd to make a Computation of the Quantity and Proportion of the Principles contain'd in Humane Blood, I am of Opinion I shall not vary from the Truth, if I affirm that in Seven Ounces of Humane Blood there are contained Five Ounces and Six Drams of Water

Water or Flegm, three Drams of a ſubtle Oil or oily Spirit, or little more, and about eight Scruples of a thick Oil, ſcarce two Drams of Salt that is all volatile, and little more than two Drams of Earth. And tho' the ſaid Proportion and Quantity of Principles may be exactly obſerved, yet we cannot from hence rigorouſly make Concluſions of the Blood of other Men; nay, nor ſo much as of the Blood of the ſame Perſon at another Time; becauſe not only of the different Things received, and the different Quantity of them, which produce different Proportions of Principles, but likewiſe the Diverſity of the Temperament of Men, Air, Exerciſe of Body, and ſeveral other Things, that contribute more or leſs to the raiſing or diſperſing of thoſe Principles, whence alſo their Proportions may eaſily vary.

At another Time I received twelve Drams of Powder from a certain *Apothecary*, which remained from a Portion of Blood taken from his own Body, and dried by a gentle Fire; from which Powder, being diſtilled with a *Reverberatory* Fire, I gain'd ſomething more than a Dram, and therefore much leſs than from the Blood examin'd before; which was, either becauſe the *Blood* of this Perſon did not ſo much abound with volatile Salt, or becauſe the other *Blood* was diſſipated before Diſtillation, or that this loſt a great deal of its Salt in drying. The reſt of the Principles I did not examine, by reaſon that I could make no Obſervations of the Flegm and Spirits from the large Evaporation that had been firſt made of them.

Hitherto I could diſcover no acid Salt either in Humane *Blood* or that of Brutes; but the contrary proves, that it is not the Matter from which the Blood is made, but that the Acids are ſecreted from the Blood; which further appears, becauſe there are few who do not eat ſome Sort of Acids or other with their Food, as Vinegar, Lemon, and the like. So Salt is continually mix'd with our Victuals, and it does not by any Tryals appear that that Acidity is deſtroy'd in Chylification, or ſeparated from the Chyle in its Paſſage to the Maſs of Blood; therefore it remains to be ſecerned or ſecreted afterwards, either by Urine, Tranſpiration, or the like, ſince we cannot find it actually preſent in the Blood. In the mean time, we ought to try if by Art we can gain an acid Salt from the Blood; for which Purpoſe, I took a ſufficient Quantity of Bullock's Blood, and boil'd it with Rain Water, then clarified the ſtrain'd Liquor with the White of an Egg, and evaporating it to the Conſiſtence of a Syrup, I reduced it to a ſmall Quantity, ſo made an Extract of the *Blood*. In the Evaporation, I perceived there was always a lixiviate Smell, which undoubtedly proceeded from the going off of the *volatile Alkali Salt*: The Extract being poſited in a cold Place, let no Salts fall to the Bottom, ſo that it was evident there remained few or none of a fix'd Nature. This *Extract* I mix'd ſeparately with various *Alkali's*, as well as *Acids*, but obſerved no Fermentation. At laſt of all I mix'd it with Syrup of *Violets*, which it turn'd green, and which was a Sign the *Alkali Salt* was predominant, as the Change of the Syrup into a Red or Purple is a Token that the Acid prevails. But becauſe this Extract did not raiſe a *Fermentation* with *Acids*, we might judge the Predominancy was ſmall; yet it is not to be doubted but that it is much greater in the Maſs of *Blood*, becauſe, as I have ſaid, in the Evaporation I perceiv'd a Smell like that of a *lixiviate Salt*: Beſides, the *alkalious Salts* are much more volatile in Animals than the *acid* ones.

Of

Of the Motion of the Heart, *and Circulation of the* Blood. *From* Harvey, Lower, Wallæus, De Buck, Ent, Bartholin, Baglivy, Verheyen, St. Hilaire, *&c. And first of* Harvey's *Circulation*, &c.

THE Heart of all Creatures being diſſected whilſt they are yet alive, by opening the Breaſt, and cutting open the *Capſula* or *Pericardium* that incloſes the Heart, you may obſerve that it ſometimes moves, and ſometimes reſts. This is evident in the Hearts of colder Creatures, as *Toads*, *Serpents*, *Frogs*, *Creviſes*, &c. but it ſhows it ſelf more manifeſtly in the *Hearts* of hotter Animals, as *Dogs*, *Swine*. If you obſerve diligently while the Heart is dying, and moves faintly, then you may plainly ſee that the Motions are ſlower and ſeldomer, and the Reſtings of longer Continuance; and you may diſtinguiſh eaſily what Manner of Motion it is, and which Way it is made.

In the *Motion*, Three Things are to be obſerved: *Firſt*, That the *Heart* is erect, and that it raiſes it ſelf to a Point, and beats againſt the Breaſt, ſo that the Pulſation is felt outwardly. *Secondly*, That there is a *Contraction* of it every Way, eſpecially of its Sides, ſo that it appears leſſer, longer, and more contracted. The *Heart* of an *Eel* taken out, and expoſed, demonſtrates it. *Thirdly*, The *Heart* being graſped in one's Hand whilſt it is in *Motion*, feels harder, which ariſes from *Tenſion*. 'Tis further obſerv'd in Fiſh, and colder Animals having Blood, that when the *Heart* moves, it looks whitiſh; when it ceaſeth Motion, or remits, it appears of a *Blood Colour*. From hence I gather'd, that the Motion of the Heart was a Kind of *Tenſion* in every Part of it, according to the *Drawing* and *Conſtriction* of the *Fibres* every Way; becauſe it appear'd, that in all Motions it was erected, received Vigour, grew leſs and harder; that the Motion of it was like that of the *Muſcles*, where the Contraction is made according to the Drawing of the Fibres; for the *Muſcles*, whilſt they are in Motion, are invigorated and ſtretch'd, from ſoft become hard, erect and thicker: So likewiſe does the Heart.

From theſe Obſervations we may conclude, that the *Heart*, whilſt it is in *otion*, ſuffers *Conſtriction*, and is thicken'd in its Outſide, and ſo is contracted in its *Ventricles*, that it thruſts forth the Blood contain'd within it; therefore theſe Things happen at the ſame Time, to wit, the *Tenſion* of the *Heart*, the Erection of the Point, the Pulſation againſt the Breaſt, the Incraſſation or Thickening of the Sides, and the forcible Protruſion of the *Blood* by *Conſtriction* of the *Ventricles*. Hence the contrary of the common receiv'd Opinion appears, which is, That when the *Heart* beats againſt the Breaſt, the Ventricles are *dilated* and fill'd with *Blood*, and that when the Heart is contracted, it is emptied: For that *Motion* which is commonly thought the *Diaſtole* of the *Heart*, is really the *Syſtole*, and ſo the proper *Motion* of the *Heart* is not a *Diaſtole*, but a *Syſtole*.

In the *Motion* of the *Heart*, theſe Things are further to be obſerv'd in relation to the *Pulſation* and *Motion* of the *Arteries*: *Firſt*, That whilſt there is a *Tenſion* and *Contraction* of the *Heart*, a Percuſſion of the Breaſt, and an apparent *Syſtole*, the *Arteries* are dilated, pulſe, and are in their *Diaſtole*. Likewiſe when the right *Ventricle* propels the *Blood* contain'd in it, the *Arterious Vein* beats, and is dilated, together with the reſt of the Arteries of the Body. *Secondly*, When the left *Ventricle* ceaſeth to move, beat, and be *contracted*, the Beating of the *Arteries* ceaſes; nay, when the *Tenſion* is but faint, the Pul-

 ſation

ſation of the *Arteries* is hardly perceptible; and ſo likewiſe in the *Arterial Vein* when the Right ceaſes. *Thirdly*, In cutting or piercing any *Artery*, in the very *Tenſion* of the left *Ventricle*, the *Blood* is forcibly thruſt out of the Wound; ſo cutting the *Arterial Vein* at the ſame Time, and in the *Tenſion* and *Contraction* of the *right Ventricle*, you ſhall ſee the *Blood* burſt out forcibly from thence.

So likewiſe in Fiſhes, cutting the great Trunk which leads from the *Heart* to the Gills, at which Time you ſhall ſee the Heart ſtiff and contracted, and thence obſerve the *Blood* forcibly driven out. *Laſtly*, As in the cutting of any *Artery*, the *Blood* leaps out ſometimes farther, ſometimes nearer, you ſhall find the Leaping out to agree juſt with the *Diaſtole* of the *Artery*: From whence it appears clear, that the *Diaſtole* of the *Artery* is at the ſame Time with the *Syſtole* of the *Heart*, and that the *Arteries* are filled and diſtended by reaſon of the Immiſſion and Intruſion of *Blood* made by the Conſtriction of the *Ventricles* of the *Heart*; as likewiſe that the *Arteries* are ſtretch'd. Again, we may ſee that the Pulſation of the *Arteries* ariſes from the *Impulſion* of *Blood* from the *left Ventricle*; juſt ſo as when one blows into a Glove, all the Fingers ſwell up together, and reſemble the Pulſation: As alſo, according to the *Tenſion* of the *Heart*, the Pulſations are greater, more vehement, frequent and ſwifter, keeping the Number, Quantity, and Order of the beating of the *Heart*.

Beſides, there are many Things obſervable which relate to the Ears, and which *Gaſpar Bauhinus* and *Riolan*, both Accurate Anatomiſts, have taken Notice of, and inform us, that if in *live Diſſections* we have Regard to the Motion of the Heart, we ſhall ſee four Motions diſtinct both in Time and Place. Now there are four Motions diſtinct in Place, but not in Time; for both the Auricles or *Ears* move together.

There are as it were at one Time two Motions, one of the *Ears*, and another of the *Ventricles* themſelves; for they are not juſt at one Inſtant, but the Motion of the *Ears* goes before, and the Motion of the *Heart* follows: The Motion ſeems to begin at the *Ears*, and to paſs on to the *Ventricles*. When all Things are already in a languiſhing Condition, the Heart dying away, as it is both in Fiſhes, and other colder Animals which have *Blood*, there intercedes ſome reſting Time betwixt theſe two Motions, and the *Heart* being as it were weaken'd, ſeems to anſwer the Motion ſometimes ſwifter, and ſometimes ſlower. Laſt of all, drawing towards Death, it ceaſes to anſwer by its Motion, and only ſeems to move inſenſibly, that it gives as it were only a Sign of Motion to the *Ears*; ſo the *Heart* firſt leaves beating before the *Ears*, ſo that the *Ears* are ſaid to outlive it. The *left Ventricle* leaves beating firſt of all, then its *Ear*, then the *right Ventricle* laſt of all, which *Galen* obſerves; all the reſt giving off and dying, the *right Ear* beats ſtill, ſo that Life ſeems to remain laſt of all in the Right. But this is chiefly to be obſerv'd, that after the *Heart* has left beating, and the *Ears* are beating ſtill, if you put your Finger upon the *Ventricles* of the *Heart*, every *Pulſation* is perceiv'd in the *Ventricles* juſt after the ſame Manner as we ſaid the Pulſations of the *Ventricles* were felt in the *Arteries*, a Diſtention being made by Impulſion of *Blood*, and at this Time the *Ears* only beating, if you cut away the Point or Tip of the *Heart*, you ſhall ſee the *Blood* flow from thence at every Pulſation of the *Ear*, ſo that from thence it appears which Way the Blood comes into the *Ventricles*, which is not by Attraction or Diſtention of the *Heart*, but by the Impulſion of the *Ears*.

It is to be obſerv'd, that all thoſe which I call Pulſations, both in the Ears and in the Heart, are Contractions, and that the *Ears* are evidently firſt contracted, and afterwards the *Heart* it ſelf: For the *Ears*, whilſt they move and beat, become whitiſh, eſpecially when there is little Blood in them; for they are fill'd, as the *Cellars* and *Treaſuries* of *Blood*, by the compreſſive Motion of the Veins, and the tending of its proper Centre; nay further, it is moſt evident in the *Ends* and *Extremities* of them, that the Whiteneſs ariſes meerly from the Contraction of them. In Fiſhes and Frogs, and the like, having but one *Ventricle* of the *Heart*, for inſtead of one *Ear*, they have a *little Bladder* placed at the Bottom of their Heart full of Blood, you ſhall moſt evidently ſee the Blad-

Bladder first contracted, and the Contraction of the *Heart* follow.

After these and the like Observations, it will be found that the Motion of the *Heart* is after this Manner: First of all, the *Ear* contracts it self, and in that Contraction throws the *Blood* with which it abounds, as the Head Spring of the Veins, and the Cellar and Cistern of *Blood*, into the *Ventricle* of the *Heart*, which being full, raises or erects it self, stretches all the *Nerves*, contracts the *Ventricles*, and makes a Pulsation; by which Pulsation it continually thrusts that *Blood*, which by the *Ears* is sent in into the *Arteries*; the *Right Ventricle* into the Lungs, through that Vessel which is called the *Vena Arteriosa*, but is to all Intents and Purposes an *Artery*; the *Left Ventricle* into the *Aorta*, and so by the *Arteries* into the whole Body.

These Two Motions, the one of the *Ears*, the other of the *Ventricles*, are so done in a continued Motion, as it were keeping a certain Harmony and Number, that they are both perform'd at the same Time, and one Motion only appears, especially in hotter Creatures, whilst they move suddenly; nor is this done otherwise, than when in *Engines* one Wheel moving another, they seem all to move together; and in the Lock of a Gun, by drawing of the Spring, the Flint falls, strikes the Steel, fires the Powder, enters the *Touch-hole*, discharges the Ball, hits the Mark, and all these Motions, by reason of the Swiftness of them, appear in the twinkling of an Eye. So likewise in Deglutition, the Meat or Drink is thrown into the *Jaws*, the *Larynx* is shut close by its own *Muscles*, and the *Epiglottis* is lifted up and opened by its *Muscles*, just as a Sack is raised to be fill'd, and opened that it may receive; it thrusts down the Meat or Drink, being received by the *thwarting Muscles*, and with the *long Muscles* sucks it down; yet notwithstanding that all these Motions are made by several and contradistinct Organs, whilst they are done in *Harmony* and Order, seem but to make one Motion and Action, which they call Swallowing.

The Motion of the *Heart* then is after this Manner, and the Transfusion and Propulsion, by Mediation of the Arteries, is one of the Actions of the *Heart*; so that the Pulsation which we feel, is nothing else but only the Impulsion of the Blood by the Heart: But whether or no the Heart contribute any Thing else to the Blood, besides the Transposition, local Motion, and Distribution of it, we must enquire afterwards, and collect out of other Observations. Let this suffice for the present, that it is sufficiently evidenced, that in the beating of the *Heart* the *Blood* is transfused into the *Arteries* through the *Ventricles* of the Heart, and so distributed into the whole Body.

Since it is probable that the Contexture of the *Heart* and its Union with the *Lungs* gave an Occasion to the Ancients to mistake the Ways by which the Blood could be carried out of the *Veins* into the *Arteries*, it will be necessary to clear up that Difficulty; and first of all, the Thing is clear enough in Fishes, who have but one Ventricle of the *Heart*, as having no Lungs; for it is certain it may be confirm'd before our Eyes, that the Bladder of Blood which they have at the Bottom of the Heart, answerable to the *Ear* of the *Heart*, sends the *Blood* into the *Heart*, and that the Heart does afterwards, through a *Pipe* or *Artery*, or something corresponding to an *Artery*, openly transfuse it, both by our own View, and also by cutting the *Artery*, the *Blood* leaping out upon every Pulsation of the Heart.

You may likewise see the same in all other Creatures, in which there is but one Ventricle only, or something answerable to it; as in the *Toad*, *Frog*, *Serpent* and *House-Snails*; which though they are said in some manner to have *Lungs*, because they have a kind of Voice, yet from ocular Demonstration it is plain, that the *Blood* in them, by the Pulsation of the *Heart*, is brought out of the *Veins* into the *Arteries*, the Way being open and manifest, there is no Occasion of Doubt or Difficulty at all, for the Case is the same with them as it might be with a Man, if the Partition of the *Heart* were pierced through or taken away, and so both the *Ventricles* become one; I believe no Body then would doubt which Way the *Blood* should go out of the *Veins* into the *Arteries*. And seeing there are more Creatures which have no *Lungs* than there are which have, and more which have but one

Ventricle than there are which have Two, we may very well affirm, that for the moſt Part the *Blood* is transfuſed out of the *Veins* into the *Arteries*, through the Boſom or Cavity of the *Heart* by an open Paſſage.

In an *Embrio* there are Four Veſſels of the *Heart*; the *Vena Cava*, the *Vena Arterioſa*, *Arteria Venalis*, and the *Aorta* or great Artery. The firſt Union of the *Vena Cava*, with the *Arteria Venoſa*, which meets before the *Vena Cava* opens it ſelf into the *Right Ventricle* of the *Heart*, or ſends out the *Coronal Vein* a little above its Exit from the *Liver*, diſplays to us its Orifice Sideways, that is to ſay, a Hole wide and large, of an oval Figure, made paſſable quite through from the *Vena Cava* into that Artery; ſo that through that Hole, called the *Foramen Ovale*, the *Blood* may freely paſs out of the *Vena Cava* into the *Arteria Venoſa*, and the *Left Ear* of the *Heart*, and ſo to the *Left Ventricle*: There is beſides, oppoſite to that Place which looks towards the *Arteria Venoſa*, a thin hard Membrane like a Cover, which afterwards in thoſe of riper Years, covering this Hole, and growing together, quite ſtops it up, and takes away almoſt all Signs of it.

The other Union is that of the *Vena Arterioſa*, and is as it were a Third Trunk, or *Arterial Duct*, perforate into the *Great Artery*; ſo that in the Diſſection of *Embrio's*, there appears as it were Two *Aorta's*, or Two Roots of the great *Artery*: This *Conduit* likewiſe in thoſe that come to mature Age, dwindles or fades away, and at laſt is quite dried up and loſt like the *Umbilical Vein*. This *Arterial Branch* hath no Membrane to hinder the Motion of *Blood* backward or forward, for there are in the Orifice the *Vena Arterioſa*, of which this is a Branch; Three Doors or *Valves*, of the Shape of a Σ, which appear outwardly and inwardly, and eaſily give paſſage to the *Blood*, flowing into the Right *Ventricle* this Way, but on the contrary hinder any Thing that may flow from the *Artery* or the *Lungs* into the *Right Ventricle*, which they ſhut very cloſe; ſo that here we have Reaſon to believe, that in an *Embrio*, when the *Heart* contracts it ſelf, the *Blood* muſt always be carried out of the *Right Ventricle* into the great *Artery*. In anſwer to the Objection that has been made, that theſe Two Conjunctions ſo large and ſpacious were made for the Nutrition of the *Lungs*, and that in thoſe of riper Years, when the *Lungs* by reaſon of their Heat and Motion require greater Supply of Nouriſhment, they ſhould have taken away and made up, is an Invention improbable and inconſiſtent; I ſay, it is viſible to our Eyes, that both in an *Egg*, whereon a *Hen* hath ſat, and in *Embrio's* newly taken out of the *Womb*, the *Heart* moves as in thoſe of *Adults*; and likewiſe Nature is preſſed with no ſuch Neceſſity as to make thoſe large Paſſages mentioned for the Nutrition of the *Lungs*; for the *Heart*, by its Motion, brings forth the Blood from the *Vena Cava*, the Right *Ventricle* receiving the *Blood* from the Auricle, propels it through the *Vena Arterioſa*, and its Branch into the great *Artery*; likewiſe the *Left* at the ſame Time, by the Motion of its *Auricle*, receives that *Blood* which is brought through the *Foramen Ovale* from the *Vena Cava*, and by its *Tenſion* and Conſtriction, drives it through the Root of the Aorta into the great Trunk: So in *Embrio's*, whilſt the *Lungs* are idle and have no Action nor Motion, Nature makes uſe of both *Ventricles* of the *Heart* as of one, for tranſmiſſion of *Blood*; and ſo the Condition of *Embrio's* that have *Lungs* and make no Uſe of them, is like that of thoſe Creatures which have none at all.

We ſhall proceed in the next Place to prove, that in the more perfect Animals, and thoſe come to Maturity, as Man, the Blood may paſs from the *Right Ventricle* of the *Heart* by the *Vena Arteria* into the *Lungs*, and from thence through the *Arteria Venoſa* into the Left *Auricle*, and from thence into the Left *Ventricle* of the *Heart*. It is ſufficiently evident that nothing can hinder this Paſſage, if we conſider how Sweat paſſes through the Pores of the Skin, or how *Urine* is ſeparated in the Strainer of the *Kidneys*; as may be more particularly obſerved in thoſe who drink Mineral Waters; thoſe therefore who deny that the Maſs of *Blood* can paſs through the Subſtance of the Lungs, and yet allow the Nutritive Juice a Paſſage through the *Liver*, ought to conſider that the Strainers of the *Liver* and the *Kidneys* are

much thicker than that of the *Lungs*, use the latter are much thinner woven, of a more Spongy Substance, if com- d to the former. In the *Liver* there is mpulsive Force, in the Lungs the Blood iven forward by the Impulsion of the nt *Ventricle*, and the Compression of the ral *Muscles*; by which Means, in the Place, there must necessarily follow a ension of the Vessels, and in the next e a Progressive Motion, by the rising falling of the *Lungs* in Respiration.

Thus much of the Transfusion of the od out of the *Veins* into the *Arteries*, how it is disposed of, and transmitted he Pulse of the Heart: Now I shall say ething of the Quantity and Encrease of *d* which passeth through the Body. en I had often and seriously considered h my self what Plenty there was of *d*, both by the Dissection of living Crea- s for Experiments sake, the opening of *eries*, and many Ways of searching, and n the Symetry and Size of the Ventricles the *Heart*, and of the Vessels which go o it, and out of it; since Nature making hing in vain, did not allot that Great- s to those Vessels to no Purpose, as like- e from the continued and careful Arti- of the *Valves* and *Fibres*, and the rest the Fabrick, and from many other ings; and when I had a long Time con- red with my self what Quantity of *Blood* s passed through, and in how short Time t Transmission was done, whether or no Nutrition we receive could furnish this no; at last I perceiv'd that the *Veins* uld be quite emptied, and the *Arteries* on other Side be burst with too much In- sion of *Blood*, unless it passed back again ne Way or other out of the *Veins* into *Arteries*, and returned into the *Right tricle* of the *Heart*. I began then to nk with my self, that the *Blood* might e a *Circular Motion*, which afterwards I nd true, and that it was driven out of *Heart* by the *Arteries* into the whole dy, by the Contraction and Pulsation of Left *Ventricle* of the *Heart*, as it is dri- into the *Lungs* through the *Vena Arte- sa*, by the beating of the Right, and t it returns through the little Veins in- the *Vena Cava*, and to the *Right Auricle* of the *Heart*; as likewise out of the *Lungs* through the aforesaid *Arteria Venosa* to the *Left Ventricle*; which Motion we may be allowed to call *Circular*.

There remains Three Things further to be confirm'd, in order to demonstrate this Circulation beyond Contradiction: First, That the *Blood* is continually, and without Intermission, carried out of the *Vena Cava* into the Arteries, in such Quantities that it cannot be recruited by any Sustenance or Aliment we take in; so that the whole Mass of *Blood* would quickly pass through. In the Second Place, That continually, and without Intermission, the *Blood* is driven into every Member and Part, by Means of the Pulsation of the *Arteries*; and that in far greater Abundance than is required for the Nourishment of the Parts, or than the whole Mass is able to furnish. And likewise, Thirdly, That the Veins themselves do perpetually bring back the *Blood* into the great Cistern or Receptacle of the *Heart*.

These Things being prov'd, I think it will appear that the *Blood* goes round, is return'd, and then driven forward from the *Heart* to the Extremities, and from thence into the *Heart* again, so makes as it were a *Circular Motion*. Let us suppose how much *Blood* the Left *Ventricle* contains in its *Dilatation* when it is full, either by Calculation or Experiment; as for Example, whether Three, Two, or One Ounce and a half of Blood: I have found in that of a Dead Man above Two Ounces. Let us suppose likewise, how much less in the Contraction the *Heart* may contain, and how much less capacious the *Ventricle* is, and from thence how much Blood is thrust out of the *Great Artery*, for in the *Systole* there is always some propelled, which we may suppose from the Texture of the Part. Therefore from a probable Conjecture we may affirm, there is sent in of this Blood into the *Artery*, a Fourth, Fifth, Six, at least an Eighth Part; so that if we grant that in a Man there is sent forth at every *Pulse* of the *Heart* an Ounce and a half, or Three Drams, or but a Dram of *Blood*, which by the Hindrance of the Valves cannot return to the *Heart*; and that the Heart in one Half Hour makes above a Thousand Pulses, and sometimes Two, Three

or

or Four thouſand: Now if we multiply the Drams, either a Thouſand times Two Drams, or Three Drams, or Five hundred Ounces, or ſuch a proportionate Quantity of *Blood* is transfuſed through the *Heart* into the *Arteries*, which is more than is to be found in the whole Body.

But if we grant that this is not done in half an Hour, according to the former Suppoſition, but allow a whole Hour or a Day for it, it is plain that more *Blood* is continually ſent through the Heart than either the Food which we receive can furniſh, or is poſſible to be contained in the *Veins*; nor is it to be ſaid, That the *Heart* in its Contraction ſometimes puſhes out Blood, and ſometimes none at all, or as much as nothing, or ſomething imaginary; for if in the Dilatation of the *Heart* the *Ventricles* are filled with Blood, it is neceſſary that in Contraction it ſhould be propelled, and that not in a very ſmall Quantity, ſince the Veſſels are large, and the Protuſion frequent; it is very neceſſary likewiſe in every Propulſion, that the Proportion of the Blood pulſed out ſhould be a Third, Sixth or Eighth Part, in Proportion to that which is before contained in the *Ventricle*, and which filled it in the *Dilatation*, according as the Proportion of the *Ventricle* in Contraction is to the Proportion of it in the Dilatation. Wherefore it is to be concluded, That if in a Man or other Animal the *Heart* pulſes out a Dram, and there be a Thouſand Pulſes in half an Hour, that there are Ten Pounds Five Ounces of Blood tranſmitted in that Time; and if at one Pulſe it ſends forth Two Drams, Twenty Pounds, Ten Ounces; if half an Ounce, Forty one Pounds, Eight Ounces; if an Ounce at every Pulſe, then Eighty three Pounds Four Ounces will be transfuſed in half an Hour out of the *Veins* into the *Arteries*.

But ſuppoſe the *Blood* paſs through the *Heart* and *Lungs* in the ſmaleſt Quantity we can well imagine, it is conveyed in greater Plenty into the *Arteries* than it is poſſible to be ſupplied by any Nouriſhment which we receive, unleſs we admit of a Regreſs by Way of *Circulation*: This likewiſe appears by our Senſes when the leaſt *Artery* is cut, for then the whole Maſs of Blood will be drained out of the Body, as well from the *Veins* as the *Arteries*, in half an Hou Time. And *Butchers* can atteſt this, wh in killing of an *Ox*, *&c.* they cut the *gular Arteries*, they drain the whole Maſs *Blood* in leſs than a quarter of an Hour, empty all the other Veſſels of the Body.

Hence it is manifeſt, and from what h been otherwiſe laid down, that the *Arter* receive *Blood* no where elſe but from t *Veins*, by tranſmiſſion through the *Hear* wherefore, if you tie the *Aorta* at the Ro of the Heart, and open the Jugular or a other Artery, you will ſee the *Arter* empty, and the Veins full. And from hen likewiſe we may obſerve in Anotomical Di ſections, the Cauſe why ſo much Blood found in the *Veins*, and ſo little in the *A teries*; why there is a great deal found the Right *Ventricle*, and but a little in t *Left*; becauſe there is no Paſſage afford from the *Veins* into the *Arteries*, but throug the *Lungs* and the *Heart*; but when t *Lungs* have expired, and leave off to mov the Blood's Paſſage is ſtop'd from the litt Branches of the *Vena Arterioſa* into th *Arteria Venoſa*, and ſo into the Left *Ventric* of the *Heart*, as in an *Embrio* it was befor obſerv'd; that it was ſtop'd by reaſon of th want of Motion of the *Lungs*, which ope and ſhut up thoſe narrow Paſſages; but ſee ing the *Heart* does not leave off Motion the ſame Time with the *Lungs*, but beat afterwards and out-lives them, it comes t paſs that the Left *Ventricle* and the *Arteri* ſend forth *Blood* into the Body, and not re ceiving it through the Lungs again, therefor appear empty. By this it is manifeſt, that th more vehement the *Arteries* beat, it happen in all Fluxes of Blood, the whole Bod is ſo much the ſooner emptied; ſo in a Faintings, Fear, and the like, when th *Heart* beats weakly, and with much le Force, that it ſtops all Fluxes of *Blood*; hen likewiſe in a dead Body, after the *Hea* ceaſes to beat, you cannot extract out of th *Jugular* or *Crural Veins*, or by opening the *Arteries*, above half the Maſs of *Blood* nor can a *Butcher*, when he has knock down an Ox, draw all the *Blood* from hi unleſs he cut the *Jugulars* before the *Hea* leaves beating.

But if any remain yet unſatisfied, an object further, ſaying, That although b th

cutting of an *Artery*, and opening a
y, it happens beyond the Courſe of Na-
, that the *Blood* is forcibly expelled, yet
loes not therefore happen in an entire
y where there is Paſſage given, and the
eries are full and conſtituted according
Nature, that ſuch a great Quantity
uld paſs in the Veſſels in ſo ſhort a
ce; ſo that there muſt needs be a Regreſs.
ſwer, That it appears from a former Cal-
ation how much the *Heart*, being fill'd,
tains more in its Dilatation than in its
nſtruction, ſo much at every Pulſation is
t forth; and that Reaſon there is, ſo
ch paſs the Body, being whole and con-
uted according to Nature. But in *Ser-*
s, and ſome Fiſhes, binding the *Veins* a
le beneath the *Heart*, you ſhall quickly
the Diſtance betwixt the *Heart* and the
ature to be emptied; ſo that you muſt
ds affirm the Recourſe of *Blood*, unleſs
will deny your own Eye-ſight; we
l confirm this with one Example: If
cut up an *Adder* alive, you ſhall ſee
Heart beat calmly and diſtinctly for a
ole Hour, and contract and thruſt it ſelf
again like a Worm; if the *Vena Cava*
ers the lower Part of the *Heart*, the Ar-
y comes out at the upper Part; now ta-
g hold of the *Vena Cava* with a Pair of
nſers, or with your Finger and Thumb,
d the Courſe of the *Blood* being ſtop'd a
tle Way beneath the *Heart*, you ſhall
on the *Pulſe* perceive that Place to be al-
oſt preſently emptied betwixt your Fin-
rs and the *Heart*, the *Blood* being exhauſt-
by the Pulſation; and that the *Heart*
ll be of a far whiter Colour, and that it
leſſer in its Dilatation for want of *Blood*,
d at laſt beats more faintly; ſo that in the
d it ſeems as it were a dying, but as ſoon
the Vein is united, both the Colour and
gneſs returns to the *Heart*: Again, if you
ve the *Veins* free, and bind the *Artery* a
tle Way from the *Heart*, you will, on the
ntrary ſee that ſwell vehemently where
d, and the Heart Tumefied as ready to
eak, which acquires a Purple Colour, till
be blackiſh, ſo that it is at laſt oppreſſed
th *Blood*, and ready to ceaſe its Motion;
ntuntying the String, it returns to its natural
onſtitution, Colour and Bigneſs; ſo that
ere ſeems to be Two Sorts of Death, Ex-
tinction through Defect, and Suffocation, by abounding with too great Quantity of *Blood*; both which are demonſtrable to our Eyes.

The next Thing to be taken Notice of are ſome Experiments, by which it will appear clear that the Blood doth enter into every Member through the *Arteries*, and returns by the *Veins*, and that the *Arteries* are the Veſſels that carry the Blood from the *Heart*, and the Veins thoſe by which the *Blood* is returned to the Heart it ſelf; and that the *Blood*, in the Members and Extremities, paſſes from the *Arteries* into the Veins, as before it did in the *Heart* and *Thorax*, out of the *Veins* into the *Arteries*; whence it is manifeſt, that in its Circulation it moves from the Centre to the Circumference or Extremities, and from thence again to the Centre.

I ſhall mention ſomething of Ligatures here, and then ſpeak of the Experiments performed by them: Some Ligatures are ſtrict or hard; others gentle, or of a middle Sort: A ſtrict Ligature is ſuch a one where the Arm is ſo ſtreightly bound with the Bandage or Fillet, that you cannot perceive the *Artery* beat any where beyond the Ligature: Such a one we uſe in the cutting off of Members, taking away of Tumours, ſtopping Fluxes of Blood, *&c.* I call that a gentle or middle Sort of Ligature, which compreſſes the Member every Way, but without Pain, ſo that it ſuffers the *Artery* to beat a little beyond the Ligature; ſuch a one is uſed in *Blood-letting*, for though you make the Ligature above the Elbow, yet you ſhall perceive the *Arteries* a little in the Wriſt, if you touch it, and the Ligature be made aright. Now if you make an Experiment upon a Man's Arm by binding, as in Blood-letting, or by the ſtronger Graſp of the Hand it ſelf, which is better perform'd in a lean Body that has larger Veins; when the Parts are heated, a greater Quantity of *Blood* is in the Extremities, and the Pulſe is quicker, for then every Thing will more evidently appear. If then you make a hard Ligature, drawing it as ſtreight as can be endured, you may firſt obſerve, that beyond that Ligature the Artery does not beat in the Wriſt, nor any where elſe; and then that immediately, that the *Artery* a-

bove

bove the Ligature has its *Diaſtole* higher, and beat more violently, and as it were with a kind of Tide, riſes towards the Ligature, as if it endeavour'd to beat through; in the mean Time, the Hand retains its Colour, only in Time it begins to be a little coldiſh. After this Ligature has continued a while, and comes on a ſudden to be unlooſed and tied gently, as in *Blood-letting*, it is to be obſerved, that the whole Hand is preſently ſupplied with Colour, and diſtended, ſo that the Veins become ſwelled and knotty, and that in the Space of Ten or Twelve Pulſes the Hand appears extremely full, a great Quantity of Blood being let paſs by the Ligature without either Anguiſh or Heat; in the mean Time, if you put your Finger upon the Artery at the very Time of Unbinding near the Ligature, you ſhall feel the *Blood* as it were paſſing under your Finger.

Moreover, he in whoſe Arm the Experiment is made upon, the Change of a ſtreight Ligature into a gentle or moderate one, ſhall plainly feel the Heat and Blood enter by Pulſation, and diſperſe it ſelf all over his Hand, as in a ſtrict Ligature the *Arteries* above are diſtended and beat, and not below, and the Veins become leſs; ſo in the gentle Ligature the Veins ſwell, and become ſtubborn, and the *Arteries* become leſs; nay, if you ſqueeze the *Veins*, unleſs you do it very ſtrongly, you ſhall hardly ſee the Blood paſs above the Ligature, or the Veins fall: Hence it appears why in *Phlebotomy*, when we would have the *Blood* leap out further with greater Force, we bind it above the cutting of the *Vein*, not below; but ſince it is driven by the *Arteries* into the lower *Veins*, in which Regreſs, by reaſon of the Ligature, the Veins ſwell and can ſqueeze it out, and throw it further through the Orifice, but the Ligature being untied, and the Way of the Egreſs being open, the Blood no longer comes but Drop by Drop: If in *Blood-letting* you untie the Band, or bind it below, or elſe bind the Member with too ſtrict a Ligature, it will not iſſue out, as if all the Force were taken from it, becauſe the Way of Entrance, and Influx of Blood through the Arteries, is by that ſtrict Ligature intercepted, or a freer Regreſs is granted through the Veins, the Ligat being untied.

Granting theſe Things to be ſo, it is c tain that the *Blood* continually paſſes thro the *Heart*; for we ſee in the Habit of Body, that the *Blood* flows conſtantly out the *Arteries* into the Veins, and not out the Veins into the Arteries; ſo that whole Maſs of *Blood* may be drawn fr the Arm by opening a Vein, if the Ligat be well made, and we may ſee it run forcibly, that it is certain all the *Blood* the Body may be evacuated this Way, well from the *Veins* as the *Arteries*; whe fore we muſt own that it is driven by Fo or Impulſion, which proceeds from the Pu of the *Heart*, and the Conſtriction or V bration of the *Arteries*.

Now it is apparent, that this *Flux* com from the *Heart*, and that it flows by a P ſage made through the Heart out of t great *Veins*, ſeeing below the Ligature t *Blood* enters by the *Arteries*, not by t *Veins*, and the *Arteries* never receive out the *Veins*, unleſs it be out of the Left *Ve tricle* of the *Heart*. Nor could ſo great A bundance any otherwiſe be drawn out one *Vein*, making a Ligature above ſo eaſi and quickly, unleſs perform'd by the im pelling Force of the *Heart*. If any on therefore ſuffer ſuch an Effuſion of Blo for half an Hour, no Body needs doubt b that the greateſt Part of it is exhauſted Faintings and Swoonings would follow and not only the Arteries, but the greate *Veins* would be likewiſe emptied: Thereſo it ſtands to Reaſon, that in half an Hour Time, ſo much Blood paſſes out of the gre Vein through the *Heart* into the *Aorta*. W may further obſerve, That in *Blood-letti* if you tie the Arm, and make a convenie Orifice, yet if Fear, Swooning, or any o ther Cauſe intervene through Paſſion of t Mind, ſo that the Heart beat more faint the *Blood* will not flow, except Drop b Drop; and the Reaſon is, becauſe the Pa being faint, and the impelling Force b weak, the Blood cannot open it ſelf a Paſſa out of the Veins, or the Heart propel through the *Lungs*.

If now that we explain which Way t Blood flows back from the Extremities th

the *Veins* into the *Heart*, and how the *Veins* are the Veſſels that carry it from the Extremities to the *Centre*, by which Means we think thoſe Three Propoſitions will be ſufficiently evident; and this is plain enough, from the *Valves* or Portals, which are found in the Concavities of the *Veins*, their Uſe, and from ocular Demonſtration. The Famous *Fabritius ab Aquapendente*, an accurate Anatomiſt; or, as the Learned *Riolan* will have it, *Jac. Silvius* firſt of all delineated the Membranal Portals or *Valves* in the Veins, being in Form of a Σ, or Half-Moon, the moſt eminent and thinneſt Parts of the inward Tunicles of the *Veins*; their Situation is in diſtant Places, after a various Manner; in divers Perſons they are connate at the Sides of the *Veins*, looking towards the Roots of them, and in the middle Capacity both of them looking towards one another, equally and duly touching one another, ſo that they are apt to ſtick together at the Extremities, and be united: And leſt they ſhould hinder any Thing to return from the larger Veins into the little Branches, or from the greater into the leſs, they are ſo placed that the Horns of the hindermoſt are ſtretched towards the middle of the Body of it, which is before, and ſo interchangeably.

The Diſcoverer of theſe *Valves* did not underſtand the Uſe of them, nor thoſe who ſaid they were made to hinder the Blood by its Weight from falling downwards; for there are in the *Jugular Veins*, thoſe that look downwards, and hinder the *Blood* from being carried upwards: There are ſince found in the *Emulgent Veins*, and Branches of the *Meſentery*, thoſe which look towards the *Vena Cava* and *Vena Porta*, but there are no ſuch in the Arteries; and it is to be obſerved, that Dogs and Cattle have all their *Valves* in the dividing of the *Crural Veins*, at the beginning of the *Os Sacrum*, or in the *Iliack* Branches, near the *Coxendix*; in which theſe is no ſuch Thing to be feared, by reaſon of the upright Stature in Man; nor are there *Valves* in the *Jugulars*, as ſome ſay, for fear of *Apoplexies*, becauſe the Matter is apt, in Sleep, to flow into the Head through the *Soporal Arteries*; nor that the *Blood* may ſtand ſtill in *Divarications*, and that all the *Blood* ſhould not break into the ſmall Branches or thoſe which are more capacious; for they are likewiſe placed where there are no *Divarications*, though I confeſs they are more frequent where there are *Divarications*; nor that the Motion of the *Blood* may be retarded from the Centre of the Body; but the *Valves* were meerly made, leſt the *Blood* ſhould move from the greateſt *Veins* to the *leſſer*, and that it ſhould not go from the *Centre* of the Body to the Extremities, but rather from the Extremities to the Centre; therefore by this Motion the *Valves* are eaſily ſhut, and hinder any Thing which is contrary to them.

I have often tried that in Diſſection, if beginning at the Roots of the *Veins*, I put in the *Probe* towards the ſmall Branches with all the Art I could contrive, it would go no further than the next *Valve*; on the contrary, if I put it in from the Branches towards the Root, it paſſed very eaſily. In many Places, Two *Portals* or *Valves* are ſo interchangeably placed and fitted, that when they are elevated in the middle of the Concavity of the *Vein*, they cloſe with one another to a Hair's Breadth, and in their Extremities and Convexities are united and interchangeably, that you can neither ſee with your Eyes, nor any Ways diſcern either Crack or Conjunction: On the contrary, from putting in a *Probe* out of the Branches towards the Trunk, they eaſily give Way, and like thoſe Gates or Sluices by which the Courſe of Rivers is ſtop'd, are eaſily turn'd back to intercept the Motion of the *Blood* from the *Vena Cava* and the *Heart*, and being cloſely lifted up in many Places, whilſt they are interchangeably ſhut, they quite hinder and ſuppreſs, nor by any Means ſuffer the *Blood* to move, either upwards to the Head, or downwards to the Feet, nor to the Sides or Arms, but ſtop and reſiſt all manner of Motion of the Blood; which is begun in the greater *Veins* and Ends in the leſſer, yet readily obey any which is begun in the ſmall *Veins*, and ends in the *greater*.

But that the Truth may the more clearly be ſhown, let the Arm of a Man alive be tied above the Elbow, as if it were to let *Blood*, there will appear in Country People, and eſpecially thoſe who have ſwoln Veins, little Knots or Swellings; and theſe Knots are

made by the *Valves*: They thus appearing in the inside of the Hand or *Cubit*, if you draw down the *Blood* with your Thumb or Finger from the Knot, you will see that none can follow, the *Valve* quite hindering it, and that the Part of the *Vein*, drawn down betwixt the Swelling and the Finger, is quite obliterated, and yet full enough above the Knot or Valve; nay, if you do retain the *Blood* so drove down, and the *Blood* emptied, and press down with the other Hand the upper Part of the *Vein*, you shall find that it can by no Means be forced or driven beyond the *Valve* or *Portal*; but how much more you endeavour to do this, so much the more you shall see at the *Valve* the Vein swell'd and distended. Hence, since a Man may make Experiments in many Places, it appears that the Function of the Valves in the Veins is the same as that of the *Sigmoides*, or Three-pointed *Portals*, which are made in the Orifice of the *Aorta*, or *Vena Arteriosa*; to wit, that they may be closely shut up, lest they should hinder the *Blood* to return back again.

Besides tying the Arm again as before, and the *Veins* swelling, if you hold the *Vein* below any Swelling or *Portal*, at any Distance, and afterwards with your Finger drive the Blood upwards above the *Portal*, you shall see that Part of the *Vein* remain empty, and that it cannot return by reason of the *Portal*; but taking away your Finger, you shall see it again fill'd by the lower Veins; so that from hence it appears plainly, that the *Blood* does move towards the upper Parts, and the *Heart* in the *Veins*, and not on the contrary. And though in some Places which are not closely shut, or where there is but one *Valve*, the Passage of the *Blood* from the Centre seems not to be quite hindered, yet for the most Part it appears so, or lest that which is negligently perform'd in some Places, is recompenied by the *Valves*. This is further to be observed, tying the Arm as before, and the *Veins* swell, and *Knots* or *Valves* appearing, if below any *Valve* in any Place where you find the next, you Place your Finger which may hold the *Vein*, that no *Blood* go from your Hand upwards, then squeeze with your Finger the *Blood* from that Part of the *Vein* above the *Valve*; then taking away your Finger, suffer it to be fill'd up by those under, and then pressing again with your Thumb in the same Place, squeeze out the *Blood*: Now you may do this a Thousand Times in a little Space: And if you compute how much by one Compression moves upwards by pressing of the *Valve*, and multiplying that by Thousands, you shall find so much Blood passed by this Means through a little Part of a Vein, so that you will find your self perfectly perswaded concerning the Circulation of the *Blood*, and of its swift Motion.

Seeing then it is confirm'd by Reasons and evident Experiments, that the *Blood* does pass through the *Lungs* and the *Heart* by the Pulsation of the *Ventricles*, and from thence is driven into the whole Body, and creeps into the Capillary Vessels, and through them returns by the little Veins into the greater; from the Circumference to the Centre, from whence it comes at last into the *Vena Cava*, and into the Auricle of the *Heart*, in so great Plenty, with so great Flux and Reflux from hence through the *Arteries*, and from thence through the *Veins* again; it must of Necessity from these Things be concluded, that the *Blood* is driven round by a *Circular Motion*, and it perpetually moves; hence arises the Action and Function of the *Heart*, which by Pulsation it performs; and lastly, That the Motion and Pulsation of the Heart is the only Cause.

Of

Of the Motion of the Blood, Sanguification and Nutrition, &c. From James De Buck, *Phyſician in Ordinary to the Town of* Rotterdam.

Blood is an Humour familiar to the Nature of Animals, contain'd in the *Veins* and *Arteries*, being compoſed of Materials fit for the Nutrition of the Parts, adminiſtring Heat to the whole Body, together with Nouriſhment for the Support of Life. The Elaboration of this Humour is called *Hæmatoſis* or *Sanguification*: This is perfected Two Ways; Firſt, in the Habit of the Body, by an Univerſal Circulation; and in the next Place, by a Mixture and Addition of ſeveral Juices jumbled together, whereby the *Hæmatoſis* is form'd, and the Animal is ſuſtained, and receives its Increaſe. I think no Man will deny the Name of *Blood* to this Humour, which is fit for a tender Body whilſt it is White, and has not as yet requir'd Redneſs for an Aptneſs of Nutrition, and not Redneſs makes the *Blood*, the Blood of many Creatures not being Red.

The Nutriment being received, and a little imbrued with the *Saliva* or Spittle, that it may the eaſier receive the Moiſture of the Mouth, it is ſent into the *Oeſophagus* or *Gullet*, and by the Help of its *Muſcles* and *Fibres* down into the Stomach, where it is watered with what iſſues out of the inner Tunicle, and being mix'd by the Force of the Stomach, is jumbled together as much as it can be: The aforeſaid *Tunicle*, the more it is diſtended, ſeems to be the thinner, and the Pores of it more open, and ſo on the contrary; wherefore there is a great Quantity of this Moiſture poured in when it contains any Thing in its Capaciouſneſs or Diſtention, which is to be diluted, than when it falls, for then it is thickened, and the Neceſſity of Dilution is not ſo preſſing. I do not believe that in any natural Operation the Colour or Conſiſtency of a Thing has been chang'd without the Addition or Detraction of Subſtance; though I believe that Heat furthers Digeſtion, ſo that it congregates Homogeneals, and diſgregates Heterogeneals; although Fiſhes, whoſe Internals and very *Blood* is cold, digeſt their Food, being ſwallowed down whole, and are Ravenous without Meaſure: This is very conſpicuous to our Senſes, for if we look but into the Stomach of a Fiſh of common Size, when he has ſwallowed another for Food, whoſe Body, becauſe it is not all at one Time conſumed in Digeſtion, but the External Parts, and thoſe that are neareſt the bottom of the Stomach, after a little while, we ſhall ſee the Reliques of the Fiſh ſwallowed, and about them the Part digeſted; and near the Sides of the Stomach a certain Juice, juſt come out of the Pores or Glands of the inward *Tunicle* like Sweat, that being more diluted than that which appears almoſt digeſted, it might be thruſt into the Gut, through the *Pylorus*, by the Force of the Contraction of the Stomach.

But leſt any one ſhould think this is done by Drink, it is certain that it is likewiſe mix'd with this Juice before it goes out of the *Ventricle*, but that it needs not ſo long Time for it, becauſe ſooner, and rather ſoft and liquid Things are digeſted than groſs Things: for being vomited up a while after it has been receiv'd, it appears thicker and more Slimy, unleſs the Stomach be diſeas'd, and be weak of Digeſtion, then it comes up thin and ſour; becauſe all that goes in wanting that favourable Juice, becomes ſour, and is corrupted. Moſt attribute this ſour Juice to the *Spleen*, but without Reaſon, ſince nothing is carried from it to the Stomach; neither Mucous, nor a thin Humour or ſharp acid Juice to further Digeſtion, or provoke Appetite, or for any other Cauſe; the Reaſon is, becauſe there is

made by the *Valves*: They thus appearing in the inside of the Hand or *Cubit*, if you draw down the *Blood* with your Thumb or Finger from the Knot, you will see that none can follow, the *Valve* quite hindering it, and that the Part of the *Vein*, drawn down betwixt the Swelling and the Finger, is quite obliterated, and yet full enough above the Knot or Valve; nay, if you do retain the *Blood* so drove down, and the *Blood* emptied, and press down with the other Hand the upper Part of the *Vein*, you shall find that it can by no Means be forced or driven beyond the *Valve* or *Portal*; but how much more you endeavour to do this, so much the more you shall see at the *Valve* the Vein swell'd and distended. Hence, since a Man may make Experiments in many Places, it appears that the Function of the Valves in the Veins is the same as that of the *Sigmoides*, or Three-pointed *Portals*, which are made in the Orifice of the *Aorta*, or *Vena Arteriosa*; to wit, that they may be closely shut up, lest they should hinder the *Blood* to return back again.

Besides tying the Arm again as before, and the *Veins* swelling, if you hold the *Vein* below any Swelling or *Portal*, at any Distance, and afterwards with your Finger drive the Blood upwards above the *Portal*, you shall see that Part of the *Vein* remain empty, and that it cannot return by reason of the *Portal*; but taking away your Finger, you shall see it again fill'd by the lower Veins; so that from hence it appears plainly, that the *Blood* does move towards the upper Parts, and the *Heart* in the *Veins*, and not on the contrary. And though in some Places which are not closely shut, or where there is but one *Valve*, the Passage of the *Blood* from the Centre seems not to be quite hindered, yet for the most Part it appears so, or lest that which is negligently perform'd in some Places, is recompensed by the *Valves*. This is further to be observed, tying the Arm as before, and the *Veins* swell, and *Knots* or *Valves* appearing, if below any *Valve* in any Place where you find the next, you Place your Finger which may hold the *Vein*, that no *Blood* go from your Hand upwards, then squeeze with your Finger the *Blood* from that Part of the *Vein* above the *Valve*; then taking away your Finger, suffer it to be fill'd up by those under, and then pressing again with your Thumb in the same Place, squeeze out the *Blood*: Now you may do this a Thousand Times in a little Space: And if you compute how much by one Compression moves upwards by pressing of the *Valve*, and multiplying that by Thousands, you shall find so much Blood passed by this Means through a little Part of a Vein, so that you will find your self perfectly perswaded concerning the Circulation of the *Blood*, and of its swift Motion.

Seeing then it is confirm'd by Reasons and evident Experiments, that the *Blood* does pass through the *Lungs* and the *Heart* by the Pulsation of the *Ventricles*, and from thence is driven into the whole Body, and creeps into the Capillary Vessels, and through them returns by the little Veins into the greater; from the Circumference to the Centre, from whence it comes at last into the *Vena Cava*, and into the Auricle of the *Heart*, in so great Plenty, with so great Flux and Reflux from hence through the *Arteries*, and from thence through the *Veins* again; it must of Necessity from these Things be concluded, that the *Blood* is driven round by a *Circular Motion*, and it perpetually moves; hence arises the Action and Function of the *Heart*, which by Pulsation it performs; and lastly, That the Motion and Pulsation of the Heart is the only Cause.

Of

Of the Motion of the Blood, Sanguification and Nutrition, &c. From James De Buck, *Phyſician in Ordinary to the Town of* Rotterdam.

Blood is an Humour familiar to the Nature of Animals, contain'd in the *Veins* and *Arteries*, being compoſed of Materials fit for the Nutrition of the Parts, adminiſtring Heat to the whole Body, together with Nouriſhment for the Support of Life. The Elaboration of this Humour is called *Hæmatoſis* or *Sanguification*: This is perfected Two Ways; Firſt, in the Habit of the Body, by an Univerſal Circulation; and in the next Place, by a Mixture and Addition of ſeveral Juices jumbled together, whereby the *Hæmatoſis* is form'd, and the Animal is ſuſtained, and receives its Increaſe. I think no Man will deny the Name of *Blood* to this Humour, which is fit for a tender Body whilſt it is White, and has not as yet requir'd Redneſs for an Aptneſs of Nutrition, and not Redneſs makes the *Blood*, the Blood of many Creatures not being Red.

The Nutriment being received, and a little imbrued with the *Saliva* or Spittle, that it may the eaſier receive the Moiſture of the Mouth, it is ſent into the *Oeſophagus* or *Gullet*, and by the Help of its *Muſcles* and *Fibres* down into the Stomach, where it is watered with what iſſues out of the inner Tunicle, and being mix'd by the Force of the Stomach, is jumbled together as much as it can be: The aforeſaid *Tunicle*, the more it is diſtended, ſeems to be the thinner, and the Pores of it more open, and ſo on the contrary; wherefore there is a great Quantity of this Moiſture poured in when it contains any Thing in its Capaciouſneſs or Diſtention, which is to be diluted, than when it falls, for then it is thickened, and the Neceſſity of Dilution is not ſo preſſing. I do not believe that in any natural Operation the Colour or Conſiſtency of a Thing has been chang'd without the Addition or Detraction of Subſtance; though I believe that Heat furthers Digeſtion, ſo that it congregates Homogeneals, and diſgregates Heterogeneals; although Fiſhes, whoſe Internals and very *Blood* is cold, digeſt their Food, being ſwallowed down whole, and are Ravenous without Meaſure: This is very conſpicuous to our Senſes, for if we look but into the Stomach of a Fiſh of common Size, when he has ſwallowed another for Food, whoſe Body, becauſe it is not all at one Time conſumed in Digeſtion, but the External Parts, and thoſe that are neareſt the bottom of the Stomach, after a little while, we ſhall ſee the Reliques of the Fiſh ſwallowed, and about them the Part digeſted; and near the Sides of the Stomach a certain Juice, juſt come out of the Pores or Glands of the inward *Tunicle* like Sweat, that being more diluted than that which appears almoſt digeſted, it might be thruſt into the Gut, through the *Pylorus*, by the Force of the Contraction of the Stomach.

But leſt any one ſhould think this is done by Drink, it is certain that it is likewiſe mix'd with this Juice before it goes out of the *Ventricle*, but that it needs not ſo long Time for it, becauſe ſooner, and rather ſoft and liquid Things are digeſted than groſs Things: for being vomited up a while after it has been receiv'd, it appears thicker and more Slimy, unleſs the Stomach be diſeas'd, and be weak of Digeſtion, then it comes up thin and ſour; becauſe all that goes in wanting that favourable Juice, becomes ſour, and is corrupted. Moſt attribute this ſour Juice to the *Spleen*, but without Reaſon, ſince nothing is carried from it to the Stomach; neither Mucous, nor a thin Humour or ſharp acid Juice to further Digeſtion, or provoke Appetite, or for any other Cauſe; the Reaſon is, becauſe there is

no Way, nor no immediate Paſſages, from the *Spleen* into the Stomach.

It is a hard Thing to ſay whether any Thing be carried from the *Spleen* to the Stomach, though there are ſeveral Learned and Judicious Men do think that the ſmaller Portion of the *Chyle* inſinuates it ſelf into the Pores of its *Tunicles*, and that being drawn together by the *Blood* returning, it is led through the ſmall Branches of the *Gaſtrick Veins* into the *Spleen*, and mix'd with the *Blood* paſſing out of the abundance of *Arteries* in that Place into the Veins, and mix'd with the Heat of the *Spleen*, that it flows through the Splenick Paſſage, with the Hemorrhoidal Blood, into the *Vena Porta* and the Liver: But ſince theſe Things are obſcure, we ſhall neither confirm or contradict them. The *Tunicle* of the Stomach ſeems to be ſo much taken up in emitting of Moiſture, that I ſuſpect it cannot ſerve Two Motions ſo contrary, as to emit from the Pores of the *Tunicle* into its Cavity, and out of its Cavity into the Pores of the *Tunicle*, at one and the ſame Time; eſpecially ſince it ſtays to be made *Chyle* there. It proves nothing that in a living Creature, tying the *Veins* which go to the *Spleen*, they ſwell that Way, for this is common to all *Veins* which are tied, to ſink towards the larger Trunks, and ſwell towards the Branches.

As to the *Gaſtrick Veins*, being graſted into a Branch of the *Splenick*, whilſt it is yet hid in the *Spleen*; the *Blood* which is ſent through them does not touch the Subſtance of the *Spleen*, only is mix'd with that which comes out of it, and with a quick Motion is carried into the *Porta* to dilute the Chyme which there it meets with, coming out of the *Glandules* of the *Meſentery*. I think that the *Spleen* was made for this Uſe alone, that it may depoſite into the *Porta* that Blood which it receives in abundance from the Branch of the *Cæliack Vein*, being firſt ſtrain'd through its thin and ſpongy Subſtance, that it may there dilute the *Chyme*, which is but little in regard of the *Blood* which flows to it, with its Abundance, together with that which returns from the Nutrition of the reſt of the Bowels; which is ſo neceſſary, that when the *Spleen* is obſtructed, and the Paſſage of *Blood* is ſtopt, and the *Chyme* is not well diluted, the whole Body, by Depravation of the Nutriment is extenuated, and the *Spleen* ſwells into a greater Bulk by the Stagnation of *Blood*.

After the *Chyle* is paſſed into the *Inteſtines*, the groſſer Part is always moved further by the Periſtaltick Motion; but that which is thin is ſqueez'd through the Glands of the Guts as their Strainers, and to Veſſels proper for its Reception, which are called the *Lacteals*; and theſe opening themſelves in the midſt of the Bowels, do receive this White Liquor like Milk into them, and then endeavouring to free themſelves from Diſtention, the others move it forward to be refined in the *Glandules* of the *Meſentery*, and this into the *Pancreas*; the *Chyle* being paſs'd by theſe Veſſels, the *Chyme* is ſqueez'd out of it by the forcible Contraction of the *Inteſtines*, and the compreſſive Weight of the Bowels lying upon it, as alſo by the continual Motion of the *Muſcles* of the *Abdomen*, and is received by the *Venæ Lacteæ*, to be depoſited in the Glandules; whence, being turned into *Blood*, as aforeſaid, it enters into the *Capillary Veins*, out of which ſliding it is diluted, by great Store of *Blood* flowing every where from the *Vena Porta*, but eſpecially from the *Spleen*, deſtined for that Purpoſe.

Chyme is the ſtrained Juice which is ſeparated from the groſſer Subſtance of the *Chyle*, and is the ſame Matter which is contain'd in the *Venæ Lacteæ*; and it is ſuppoſed that this, after it is paſſed the *Adenes* of the *Pancreas* and *Meſentery*, and received into the little Branches of the *Vena Porta*, may very well be called *Chyme*: To this *Chyme* anſwers that Preparation of the *Blood* in the *Placenta*, whilſt the Birth is yet in the Womb, in which a Juice deſcending from the Body of the Womb, is diluted with Blood brought through the *Umbilical Arteries*, both for Nutrition, as likewiſe for the Performance of this Work, and is mix'd, and then acquires the firſt Diſpoſition of *Blood*. Afterwards the *Bile* or *Choler* is added to the *Blood* which was thought by all the Ancients to be an Excrement, as being contrary to the Nature of Animals, which delight in ſweet Things, and are nouriſhed by them. The Bileary, or Gall-Bladder, conſiſts of a Membranous Subſtance, which may be contracted and exten-

extended. Beſides that which is common to the Entrails, it has a ſtrong *Tunicle* of its own, ſtrengthen'd with all Manner of *Fibres*. The narrow Neck of this Bladder ſtretch'd out in Length, makes up the Biliary Paſſage, call'd the *Ductus Cholidochus*. In this are placed *Valves*, which, beſides hindering any Thing from entring into the Bladder thro' this Paſſage, ſtop the Return of the *Choler* after it is once out; which appears, when with our Fingers we endeavour to ſqueeze back which we have preſs'd out of it, for we can by no Means thruſt it back again.

This Paſſage is divided into two Tracts, of which the one being firſt divided into two, then into more, and afterwards into many Springs, paſſes through the *Liver*, that the *Gall*, being divided into very little Parts, may be moved forward into the *Vena Cava*, paſſing through the *Liver*, together with the *Blood* that flows from the *Vena Porta*. The other going further, is obliquely grafted into the Beginning of the *Jejunum*, being drawn down betwixt both the *Tunicles* of the *Inteſtines* about the Length of two Inches, ſo that it makes one Hole in the Gut, together with that which runs through the *Pancreas* through the aforeſaid Paſſage, or being paſs'd through the Hole to the *Venæ Lacteæ*, to be prepared with the Juice of the *Chyle*.

It ſeems to me abſurd that two Liquors ſhould meet without Mixture, that the Inteſtines ſhould ſqueeze out the groſſer, and the *Venæ Lacteæ* receive it, and yet not receive that which is thinner. It is fit that the *Gall* ſhould be added to this inſipid and ſweet Liquor, both that its Sharpneſs and exceeding yellow Colour might be temper'd with this crude white Juice, as likewiſe that its dull Inactivity might be put in brisker Motion. If the other, that is, the Paſſage which goes to the Inteſtines, be ſtop'd, or by external Compreſſion be ſo ſtreighten'd that the Way of the Bile to the *Inteſtines* be hinder'd, it is by another Paſſage convey'd into the Maſs of Blood, and turns the whole Body yellow. From hence I am ſatisfied, that the *Choler* or *Gall* is not an Excrement of the *Liver*, but being made for a better and more common Uſe, it is firſt collected in the Bladder, and in due Time is both mix'd with the *Chyle* and the *Blood*. Thus we affirm, that the *Blood* being alter'd with theſe divers Mutations, and mix'd with that in the *Vena Cava*, which returns from the whole Body, is alimentary, and fit for the Nutrition of all the Parts, being diſtributed to them by proper Veſſels appointed for that Uſe.

That the *Blood* may be turn'd into Nouriſhment for the Body, there are two Things very neceſſary, Motion and Preſſure, by the Help of which, it may flow or be mov'd to thoſe Parts which are to be nouriſh'd. Since this does not depend on the Blood, but is different from it, as that which moves from that which is moveable, it contributes nothing to the *Hæmatoſis*. Indeed, this Fluxibility or Motion appertaining to its Conſtitution, ought to arrive from Sanguification, and be reducible to the *Hæmatoſis*. The *Serum* or Air that is mix'd with the Blood, make it moveable: By the former, the Members are made flagging, ſoft and unactive; by the latter or aerial, the ſolid Parts are render'd more robuſt and vigorous. And though *Serum* is neceſſary for the Augmentation and Nutrition of the tender Parts of an *Embrio* in the Womb, when it grows bigger, beſides that Nature in requiring Aliment wants Air, it has likewiſe need of it to facilitate the Motion of the *Heart* and *Brain*; for they are moved continually and agitatated by an alternate *Syſtole* and *Diaſtole*; nor are they hinder'd by the Birth being tender, for the whole *Breaſt*, with the *Heart*, *Brain*, and *Cranium* it ſelf, cover'd with a Film, riſes and falls again. The Members growing ſolid in Time, the Bones daily acquire a greater Degree of Hardneſs, and are more reſiſting to the Motion. In the mean time, the Strength of the Body, and the *Heart* growing, the Pulſes and Motion of the Brain become greater, which Diſcord going on, it comes to paſs, that the Birth being inſtigated by a Neceſſity of freer Motion, is incited to change Place for more Air, and ſo the Delivery is haſten'd.

The Infant coming into the World, it is ſeriouſly to be obſerved, that the *Blood* is moiſten'd, and made more ſubtile by the Attraction of the Air, whence the Excrements, which in Time of Geſtation were but few, are augmented, and the ſerous Humour, that is of leſs Importance to its further Nutri-

tion,

tion, is voided in greater Plenty; ſo that it is obſervable, that an Infant born without an open Paſſage for Urine or Excrement, will die in a ſhort Time. By the Conſideration of theſe Things, I am perſwaded, that neither this *Blood*, or any other which is contained in the *Veins*, is fit for the Nutrition of the Parts, unleſs being mix'd with a due Proportion of Air, and ſo enliven'd, it can be admitted into the leaſt Part of them; for Nutrition is not made by external Addition, but when the Nouriſhment is fitly adapted not only to every Part, but duly to every little Portion, and ſo aſſimilated to it. It is clear enough, that this Fluxibility is given to the *Blood* by the *Air*, being a moiſt thin Body, and proper for Motion. But if it be objected, That it is only neceſſary for the Motion and Cooling of the *Heart*; the Anſwer is eaſily given from the Example of Fiſh; for though they are always cold, they ſtill draw up Water at every Pulſe of their *Heart*, and ſend it out at their Gills, with which they might be both ſatisfied for the Motion of their *Heart*, and for Refrigeration, if they needed any ſuch; yet to them is aſſigned a little *Bladder*, in which they carry *Air* along with them, that they may ſtay under Water, and not always be forced to ſwim at Top to take in the *Air*; for if being taken with a Net or Weed, they be kept long under Water, and hinder'd from breathing, the *Air* in their little Bladder being ſpent, they are ſuffocated and die.

Columbus, a famous Anatomiſt in his Time, was the firſt who was of Opinion that the Mixture of the Blood with *Air* was perform'd in the *Lungs*, and that this Blood was made vital; for conſidering the Capaciouſneſs of the *Vena Arterioſa*, he thought it was appointed for ſome other Uſe than to carry Nutrition to the *Lungs*; for (ſays he) if the vital *Blood* is not brought to the *Lungs*, it is created in it, but is not given to it from any where elſe; for it has no Branch from the *Aorta*, nor by the *Arteria Venoſa*, which, by reaſon of its *Valves*, receives no *Blood* from the *Heart*; for if it did, it would beat: Therefore it follows that it is bred there, ſince live Diſſections demonſtrate that the *Arteria Venoſa* is full of *Air* as well as *Blood*, and is without *Pulſe*. Now there is always *Air* ready in the *Lungs*, and they are properly form'd for ſuch a Reception; for their Fleſh is ſoft, light, thin and ſpongy, and ſo interwoven with different Kinds of Veſſels, that it is render'd full of Holes like a Sponge.

There is required in the Action or Production of Heat in the living Creature, firſt Motion in the Blood, then ſomething to move it, and laſtly a Diſpoſition of the Ways or Paſſages through which and to which, as to Bounds, it may be mov'd and contain'd. It has its Motion partly from the *Serum*, but chiefly from the *Air*, which is added to the Blood in the *Lungs* by the Mediation of this, that it being diviſible into infinite Parts, can paſs through all, even the thickeſt Parts. There is ſo great an Affinity betwixt Diviſibility and Motion, that the more eaſy a Thing is ordained to be divided into leſs Parts, it is ſo much the more moveable, Motion being abſolutely neceſſary to the *Blood* for diſtributing of Nouriſhment; for Nutrition is the Union and Aſſimilation of the nutritive Humour to every Part, which Nutriment, that it may become one living Thing, together with that which is to be nouriſhed, is not perform'd by external Appoſition, but it ought ſo to paſs the leaſt Particles of the Members, that, according to all their Dimenſions, it may be added and united to them.

It is likewiſe to be obſerv'd, that all that is brought thither is not united, ſince the ſelf ſame *Blood* has various Parts in it, of which ſome are moſt fit and apt for this Part, and other ſome for another Part, yet none ſtick to them (being oppos'd) but thoſe that have a Reſemblance with them, the reſt being unfit, return to the *Veins*. If there be a greater Quantity added than is exhauſted, there is made an Accretion; but if a Part that did adhere before, be carried away with it, there happens an Extenuation of the Parts. The very Way of its Preparation ſhews the Motion of the *Blood*; for no Part of *Chyle* is admitted into the *Lacteals* but the thinner and more agile Part of it, which, after it has firſt paſs'd the Glands of the *Meſentery* and the *Pancreas*, and mixed with a little *Bile*, it is at laſt impregnated with the finer Particles of the Air in the *Lungs*, to give it its requiſite Perfection.

This

This Motion of the *Blood* is not ſufficient alone to the Production of Heat; for unleſs it be driven by ſome impulſive Force, and be agitated with a ſwift Motion, it ſhould never become hot; and though the Blood be diſpoſed to Motion, if it be deſtitute of vital Spirits, it is no ways able to move it ſelf, and theſe vital Spirits chiefly affect or act upon the Heart, which having large and ſpringy *Fibres*, readily contract and thruſt out the *Blood* received from the *Auricles* into the *Arteries*, without any other Intention but to eaſe it ſelf of that heavy Burthen, with ſuch frequent and ſwift Pulſations, that from them, and likewiſe by comparing the Contractions and Dilatations of the *Heart*, the Greatneſs of the Flood-gates, and the Elevation ſenſible to the Touch of all the *Arteries* through the whole Body, one may by Conjecture eaſily gather how ſwiftly, by a continual Motion, the *Blood* paſſes through all the Parts.

The *Arteries*, and all the Parts, ſecond the *Heart* in this Motion, they being fill'd and ſwell'd by the Force of the Action of the *Heart*, when they are contracted and oppreſs'd by a Weight of the neighbouring Part, as the *Pulmonary Arteries* into the *Lungs*, and the *Aorta* into the whole Body. Let no Man therefore ſuppoſe, becauſe the *Blood* leaps out by the impulſive Action of the Heart in the *Diaſtole* of a wounded *Artery*, that the Blood has all its propulſive Force from the *Heart*, and that the *Arteries* contribute nothing to it, becauſe it ſeems to leap out when they are fill'd. It will not from thence be concluded, that the *Blood* in the *Syſtole* of the *Arteries* does not move farther, for they fall and are contracted, that they may riſe again in their *Diaſtole*; and though at that Time the *Blood* does not flow out of them with ſo great Force as to leap, yet it ſlides out of them as out of a Vein, and as much as the cloſing Lips will ſuffer to flow forth.

It appears how much Power the *Arteries* have in Protruſion of *Blood* by the Ligature; for no ſooner by it, nay even the great *Artery* is tied, but immediately beyond the Ligature it is emptied in the Space of three or four Pulſations, although by Hindrance of the Band there proceeds no impulſive Force from the *Heart*. The Parts which make up the Ways through which the *Blood* may paſs, and in which, as in Bounds, it may be contained, and its Heat preſerv'd, are the *Heart*, the *Arteries*, the *Pores*, and the *Veins*, with their *Appendices*. The *Vena Cava*, with its *Auricle*, the right *Ventricle* of the *Heart*, and the *Pulmonary Artery*, make up one Paſſage together, as the *Vein* of the *Lungs*, and the *Auricle* faſten'd to it, and the left *Ventricle* of the *Heart*, with the *Aorta*, make up another. Either of theſe is joint and undivided, apparent to the View, only in moſt Places it is clos'd with *Valves*, hindring the Regreſs of the *Blood*. There are a great many of theſe which are connate in the Concavities of the *Veins*, both becauſe there is an Inequality in the Motions of the Body, as likewiſe becauſe by outward Compreſſion they eaſily yield, from the Softneſs of their *Tunicles*, whence not only the Motion of the *Blood* might be hinder'd, but to the great Damage of the Body, it might be preſs'd backwards, unleſs that were prevented by Nature with *Valves*.

Theſe are framed at the Entry and Egreſs of the *Heart* only for the firſt Reaſon, to wit, becauſe the Motion of the *Auricles*, *Heart* and *Arteries*, is not the ſame, but different. There is none granted to *Arteries*, becauſe at one Puſh they are elevated by the Action of the Heart, and when that ceaſes, they are likewiſe contracted and fall; next, becauſe of the Hardneſs of their Subſtance, they are not ſo eaſily ſqueez'd together by the Weight of the Parts adjoining. In theſe Paſſages, the *Blood* gains nothing from the *Heart* or *Arteries* but a ſwifter Motion; all that it has, is added to it by the *Veins*. The Beginning of theſe deſcrib'd Paſſages begin together with the Veins, and like Marks or Bounds, end together with the *Arteries*, both which Parts are ſimilar, ſo call'd, becauſe they have a Similitude one to another, and any Part of them is call'd by a like Name, a *Vein*, or an *Artery*: Therefore whereſoever they are ſo ingrafted into the Subſtance of the Parts, and are ſo entangled with many Diviſions and Divarications, that they quite loſe both Name and Similitude, they are taken for Subſtance, which flows thither for Nutrition of the Parts.

Whe-

Whether Harvey *thought that the* Ventricles *of the* Heart *were ſo expanded in the* Syſtole *that they might receive* Blood, *and ſo ſhut up again in the* Diaſtole *as to thruſt it forth; that ſuch a Sequel did follow from the Suppoſition of* Carteſius. *By the ſame Author.*

I SEE no Reaſon why the Famous *Des Cartes* ſhould ſay that the Venerable *Harvey* thought that the *Ventricles* of the *Heart* dilated in its *Syſtole* that they might receive *Blood*, and were ſtraighten'd in the *Diaſtole* that they might propel it into the *Arteries*. *Des Cartes* thinks, that the *Heart*, by reaſon of the Ebullition of Blood rais'd by its implanted Heat, ſwells and riſes into *Diaſtole* at that Time when the Breaſt is ſtruck, and the *Pulſe* may be felt outwardly. *Harvey* ſays, that the *Heart*, at the ſame Time that it ſtrikes the Breaſt, ſtretches all the *Fibres*, erects it ſelf, is on all Sides contracted, and is in its *Syſtole*. The ſame Time in which one ſays there is a *Syſtole*, the other ſays there is a *Diaſtole*.

Is it fit for *Des Cartes* to aſcribe that to *Harvey* which is againſt his Opinion? As if he had ſaid, that the *Heart* was dilated, and received *Blood* in the *Syſtole*, becauſe *Des Cartes* is of Opinion that the *Syſtole* is at that Time, though he affirms and demonſtrates that the *Diaſtole* is then made. *Harvey* by the ſame Right might ſay the like of *Des Cartes*: But let us examine whoſe Opinion is beſt.

Harvey, who was an exquiſite Anatomiſt, obſerv'd two diſtinct Times in the Motion of the *Heart*, to wit, one Time of Motion when the *Heart* moves it ſelf and is in Action, and another Time of Reſt, in which ceaſing from Action, it is moved and extended by the Immiſſion of *Blood* from the *Auricles*. He ſays, that theſe Times may be more manifeſtly diſtinguiſh'd and accurately obſerv'd in colder Creatures; yet in hotteſt Creatures, the beſt Obſervations are to be taken when the *Heart* begins to die, and beat more ſlowly and faintly; for then the Reſts are longer, which in a vigorous and lively *Heart* can hardly be diſcern'd: Then likewiſe the Heart is ſeen, after the Performance of its *Syſtole*, to be at Reſt, and to be, *viz.* in the Creature departing, looſe, flagging, weaken'd, and lie as it were drooping.

He ſays, that the *Auricles* at this Time do ſtretch and contract themſelves, and by Impulſion drive the *Blood* into the *Ventricles*, in the Diſtention of which they make a *Diaſtole*; which being done, that is to ſay, when it is extremely diſtended, begins the Motion of the *Heart*, at which Time contracting it ſelf every Way, and leaning upon its *Baſis*, it is erected, and being leſſer in Quantity, and oblong, it lifts up its Point, and ſtrikes the Breaſt. He calls this Time the *Syſtole*, the former the *Diaſtole*. The firſt begins when the *Heart* is emptied and reſts from its Work, and leaves off when the *Heart* is full: The other begins when the *Heart* ſtretches all the Fibres, and contracts them, and ends when that Work is finiſh'd. Let any Man then judge if *Harvey* be of Opinion that the *Blood* in the *Syſtole* is received into the dilated Ventricles of the *Heart*, and thruſt out into the *Arteries* in the *Diaſtole*, when they are ſtraighten'd, eſpecially ſince the Matter being yet in Controverſy, it is not determined whoſe Opinion is the beſt.

Let us examine *Des Cartes*'s Opinion of the *Syſtole* and *Diaſtole*, and try whether or no that will follow from his own Writings clearly, which he carps at in others. Seeing the *Diaſtole* and *Syſtole* have their Times in which they are meaſured, and are mutually diſtinguiſh'd one from another, let us ſee how the Beginning of one, and the End of the other, can be diſcern'd from his Suppoſition. We know the Difference of the *Syſtole* and *Diaſtole* by our Touch only, which is moſt uſual in the Pulſe of the *Arteries*, or meerly by Reaſon. The firſt Way is, becauſe the Extenſion of the *Heart*, as likewiſe of the *Auricles* and *Arteries*, is a *Diaſtole*, and a *Syſtole* the Contraction of it. That Time which is nigheſt to the higheſt Extenſion, is of the *Diaſtole*; as likewiſe, that is ſaid to be of the *Syſtole*, which is next to the higheſt Contraction. The *Diaſtole* begins, in the middle Way to Contraction it ends, the reſt of the Time is aſcrib'd to a *Syſtole*. The other Way, which is by the Help of Reaſon, is ſaid by *Des Cartes* to begin when the Ebullition begins, when the Heart begins to ſwell with *Blood*; and the *Syſtole*, when in the Refrigeration of the *Blood* it falls again. Let it be taken how you will, it follows of Neceſſity, that the *Blood* in the *Syſtole* is admitted into the *Ventricles* of the *Heart*, and that it is ſent abroad in its Dilatation or *Diaſtole* into the *Arteries*.

In the firſt, there is no Doubt it remains that we demonſtrate it according to the laſt Way, ſeeing he himſelf does not aver it openly, but ſays, as ſoon as two Drops of *Blood* are enter'd, that is to ſay, into either of the Concavities, which are preſently dilated and rarefied by reaſon of Heat which they find there; for which Cauſe they make all the Heart ſwell, and do withal preſs upon and cloſe the five *Valves* that are in the Entry, from whence they flow. *Des Cartes* ſeems to affirm, that the *Blood* is enter'd before the Ebullition begins; for (ſays he) after the Drops are enter'd, the *Blood* is rarefied, which makes a *Diaſtole*; whence it is apparent, they came in in the *Syſtole*. The Conſequence likewiſe teaches us, that the *Blood* enters into the *Ventricles*, when the *Valves* placed at the Heads of the *Veins* are open; but it goes out when they are ſhut, and thoſe of the *Arteries* are open. But *Des Cartes* opens the *Valves* of the *Veins* in the *Syſtole*, and ſhuts them in the *Diaſtole*; therefore the Blood enters into the *Ventricles* of the *Heart* in the *Syſtole*, and not in the *Diaſtole*.

Beſides, he imagines that the *Arteries* come to be in their *Diaſtole*, by reaſon the Blood entring is dilated, and that they have their *Syſtole* when it is refrigerated; wherefore in the *Arteries*, out of which the Cauſes of the *Syſtole* are deriv'd, the Times of its Entry and Condenſation will be more diſtinct than in the *Heart*, from which the Cauſe is taken of its *Diaſtole*, Entry and Dilatation. But what need we many Demonſtrations? The Learned *Regius*, *Profeſſor* of Phyſick in the Univerſity of *Utrecht*, and a notable Follower of *Des Cartes*'s Philoſophy, in expreſs Words ſays, That the *Diaſtole* is a Part of the *Pulſe*, in which the *Heart*, by the rarefied Blood coming out of the *Vena Cava* into the right *Ventricle*, and out of the *Arteria Venoſa* into the Left, in the *Syſtole*, according to its Depth and Breadth is dilated and ſwell'd; and a little after he continues, Nor is this Part of the Pulſe to be accounted the *Syſtole* of the *Heart* from thence, becauſe cutting away the Point of the *Heart* in a living Creature, the *Ventricles* of it are felt in this Caſe, and ſeem to be ſtraighten'd; for the *Diaſtole* of the *Heart* is not to be reckoned from the Dilatation of the *Ventricles*, but from the Swelling of the *Heart* it ſelf, which may come to paſs when the *Ventricles* are ſtraighten'd. 'Tis therefore to be concluded, that *Des Cartes* determines that which he carps at in *Harvey*, to wit, That the *Ventricles* are dilated in the *Syſtole* that they may receive *Blood*, and are ſtraighten'd in the *Diaſtole*, when the *Blood* is thruſt out into the Arteries.

May not *Harvey* with good Reaſon ſay, that *Des Cartes*'s Opinion concerning the Motion of the *Heart* is deſtroy'd by his own proper Experiment, in which he ſtrives to confute the Opinion of the Famous *Harvey*? And ſince we have gone ſo far to know the different Opinions of theſe two Eminent Men, it will not be amiſs in comparing their Arguments, to ſee which of their Opinions is more plauſible. It being received through all Ages, that the *Diaſtole* of the *Heart* was then performed, when by

Extenſion like a Pair of Bellows, and drawing *Blood* into the *Ventricles*, it was ſaid to be fill'd, and that that came to paſs at ſuch Time when it ſtruck the *Breaſt*, and the Pulſation was felt outwardly. The Immortal *Harvey* obſerv'd, that at that Time there was not a *Diaſtole*, but a *Syſtole* perform'd; nor was the *Heart* dilated, or receiv'd *Blood*, when the *Heart* being at Reſt, and deſiſting from its Labour, was extended by a greater Quantity, the *Blood* being thrown into the *Ventricles* by the *Syſtole* of the *Auricles*, the *Syſtole* being an Action of the *Heart* by which it thruſts out that *Blood* which it receives into the *Ventricles* into the *Arteries*, and raiſes them into a *Diaſtole*.

It is to be taken Notice of, ſays he, that the *Heart*, when it moves it ſelf, is contracted and ſtretch'd like other Parts which are contracted in Action likewiſe, whence it comes to be of leſs Compaſs, which is both apparent to the Touch and Sight, becauſe it is leſſen'd, and is perceiv'd to be harder and more ſpringy. He proves this Conſequence by the Example of the *Muſcles*, which, when they contract themſelves, become harder and more reſiſting. Beſides, the *Fibres* being contracted, are ſhorten'd and grow thicker, and ſo the Subſtance and Walls of the *Heart* are thicken'd at that Time. He proves, that the *Ventricles* are not fill'd with Blood at that Time, becauſe they become narrower, and are more conſtricted and leſs capacious, as likewiſe they are ſeen to be emptied; for upon the giving of a Wound, the *Blood* comes out leaping, which is thruſt out by the Contraction of the *Heart*. Laſtly, the *Heart* becomes whiter, which, when it is fill'd, is fluſh'd with a red Colour, which is more apparent in Fiſh, and colder Creatures.

All the Parts, when in Action, are invigorated, but reſting, are flagging and ſoft. In the Time of the Pulſation, the *Heart*, becauſe it is in Action, is invigorated, contracted, and erects it ſelf ſo much that it ſtrikes the Breaſt. Theſe are the Reaſons from *Harvey*, by which induced, he endeavours to ſhow there are two diſtinct Times for the Motion of the *Heart*; one, when contracting it ſelf, it ſtrikes the Breaſt, in which the *Syſtole* is perfected; another of its Reſt, in which the *Diaſtole* is perform'd, and the *Heart* is fill'd with *Blood* and diſtended. *Des Cartes* attributing no Action proper to the *Heart*, but affirming that its Motion is excited by no foregoing Power, but by the Heat which is implanted in it, that dilates the *Blood*, and raiſes its Ebullition, thinks, that the *Heart* is erected, and ſtrikes the Breaſt from theſe Reaſons. In a live Coney, ſays he, after the Top was cut off, the Baſis of its *Heart* remaining ſtill faſt to its Veſſels, did beat long enough, and in it I ſaw plainly thoſe Concavities that are call'd the *Ventricles* of the *Heart*, become large in the *Diaſtole*, and narrower in the *Syſtole*. And a little while after, you muſt take Notice, that to perform this Experiment aright, you muſt not only cut away the very Point, but half the *Heart*, or more, and that you muſt eſſay this in a *Coney*, which is a fearful Creature, and not in a Dog; for in Dogs, the *Ventricles* have ſeveral Involutions, the Concavities of every one of which are ſo extended by the Dilatation of the *Blood*, that in the mean time the general Concavity of either of the *Ventricles* is more ſtrengthen'd: And laſtly, being taken hold of with the Hand, it feels a great deal harder in the *Diaſtole* than in the *Syſtole*. To theſe *Regius* adds, if at that Time the *Heart* and the *Arteries* be wounded, the *Blood* is ſeen to leap out from the ſwelling *Heart* and dilated *Arteries*. Beſides, ſays he, at what Time the Impulſe of the *Artery* is ſaid to ceaſe, at the ſame Time we ſee that Side of the *Heart* which looks towards the *Sternum* falls, and eſpecially there where it anſwers to the Orifice of the *Aorta*; and the right Side and the left, towards the right and left Ribs, flags, the Point recedes from the *Baſis*, and the whole Heart becomes looſe, flagging and ſoft; but wounding the *Heart* and *Arteries* at that Time, no *Blood* comes from them, but their Wounds cloſe.

Theſe are the Demonſtrations on both Sides: If then theſe Reaſons are according to the firſt Way that was ſaid how the *Diaſtole* and *Syſtole* ſometimes might be diſtinguiſhed, that is to ſay, if the *Diaſtole* be ſaid to be when the *Heart* is exceedingly ſwell'd, and the *Syſtole* when it is leſs ſwell'd, the Arguments of *Des Cartes* and *Regius* will appear to infer ſomething. But if you conſult Reaſon, you ſhall find, that the *Syſtole* begins in the Height of the *Diaſtole*, to wit,

when

when the *Heart*, extremely extended by the *Blood*, ſtretching or contracting the *Fibres*, thruſts it out into the *Arteries*; but it deſiſts from this Action, when not being able to contract the *Fibres* any more, it looſens them, giving Occaſion to a new *Diaſtole*, which begins when the *Heart* leaves Action, and is done whilſt the *Heart* is quiet, and till it begin a new Contraction.

The *Diaſtole* and *Syſtole* being thus conſider'd, a blind Man may ſee that the Opinion of *Harvey* is eſtabliſh'd with the ſtrongeſt Reaſons; and that it muſt be concluded, that whilſt the *Diaſtole* is perform'd, that the *Heart* is at Reſt, that the *Ventricles* are fill'd and become larger, that the Walls are extended and grow thin, and that it ſelf is augmented according to all its Dimenſions; and that in the *Syſtole*, it moves it ſelf by its own proper Action, it is invigorated by Contraction, the Walls of it are thicken'd, it ſelf leſſen'd, it advances its Point, the *Ventricles* are ſtraighten'd, and by ſqueezing are emptied, the *Blood* is thruſt into the *Arteries*, and in the mean time they advance themſelves into a *Diaſtole*, at the ſame Time when the *Auricles* are erected.

Theſe Things will appear plainer, if in a healthful or lively Body, you conſider that the Sides of the *Heart* do not fall or flag, or grow looſe and ſoft towards the right or left Sides, but that this happens only in dying Creatures; Examples of which *Harvey* alledges, that the Time of the proper Motion of the *Heart*, and its Reſt, might be more evidently diſtinguiſh'd, and that he might eaſier demonſtrate, whilſt all the Actions are ſlow, that the *Heart* moves and contracts it ſelf in the *Syſtole*, and reſts from Action in the *Diaſtole*. By a ſound Animal theſe Things are ſo quickly perform'd, that ſcarce has the *Heart* done its Contraction, but it is fill'd again, by the Urgency of the *Blood* through thoſe open Ways, and Contraction of the *Auricles*, in the Twinkling of an Eye, and ſometimes ſooner, ſo that it is a hard Thing to diſcern the filling and emptying, if not impoſſible to do it. It is true, that at the ſame Time *Blood* leaps out of the Wounds of the *Heart* and *Artery*, in the *Syſtole* of this, and the *Diaſtole* of that, by the Urgency or Contraction of the *Heart*; for this being empty whilſt it is fill'd, and erected by the *Auricle*, altho' the *Blood* come out in the mean time, yet it comes not out with leaping, for the Action of the *Auricle* is not ſtrong enough; then the *Ventricles*, which are empty, and muſt be fill'd again, hinder the leaping out of it; but the more forcible contractive Strength of the *Heart* makes the *Blood* leap out through both Wounds.

Let us to theſe ſubjoin our own Arguments, by which we think *Harvey*'s Opinion may be further confirm'd. If the *Blood* was rarefied, and acquired greater Space in the right *Ventricle*, Nature ought to have given a greater Orifice to the *Pulmonary Artery*, which might be wide enough for the Paſſage of the *Blood*; the very Quantity which enter'd in the *Diaſtole*, ought to come out in the following *Syſtole*, the Bulk of which, if it be augmented, would need a greater Outlet, according to the Increaſe of the *Blood*, no leſs than we ſee the *Foramen* of the *Vena Cava*, by which it is join'd to the *Heart*, anſwers to the Bigneſs of the Part which is above the *Heart*, and likewiſe to that which is below the *Heart*. Moreover, it is certain, that according to *Des Cartes*'s own Confeſſion, the *Auricles* have a contrary Motion to the *Heart* when it is rais'd; and indeed at that Time when the *Diaſtole* of the *Heart* is according to *Harvey*, they are emptied, and fall; but when, by its Contraction, it ſtrikes the Breaſt, they are fill'd, and ſwell. From theſe Things it manifeſtly appears, that it is to be concluded, that at that Time when it ſtrikes the Breaſt, it moves it ſelf by Contraction, it thruſts out the *Blood* into the *Arteries*, and is in its *Syſtole*; but when it deſiſts from this Action, and is at Reſt, it is fill'd with *Blood* and extended, the Cavities are made larger, the Sides made thinner, the whole is augmented, and in its *Diaſtole*, quite contrary to the Opinion of *Des Cartes*.

Of the Action of the Heart, and the Motion of the Blood *called Circulation; with ſeveral Material Things that depend thereon. From* Diemerbroeck, Willis, Etmuller, Duncan, St. Hilaire, *&c.*

THE Action of the *Heart* is to receive the *Blood* from the *Veins* in the *Ventricles*; to wit, That of the *Vena Cava* in the Right *Ventricle*, and that of the Pulmonary Vein in the Left, for the perfecting and ſubtilizing thereof, and for the better Diſtribution of it afterwards into all the Parts of the Body, which is perform'd by its Motion, which we call a *Pulſe*. The Motion of the *Heart* is called in *Latin Pulſus*, the Pulſation or Beating, by which the *Heart* raiſes or erects it ſelf, or elſe ſwells and ſinks alternately, or the Motion is made by *Diaſtole* and *Syſtole*, that is to ſay, by *Dilatation* and *Contraction*, there being a ſmall reſting Space betwixt the Two Motions.

The *Diaſtole* is a Lengthening of the *Heart*; the Motion called *Dilatation*, being made when the *Blood* preſſing the Sides of the *Ventricles* to enter, forces the *carnous Fibres* to ſtretch out lengthways, and when the Point is extended from the *Baſis*, the *Heart* becomes much longer, and its Cavities larger. The *Syſtole* is the Return of the Heart, the Motion of Contraction being made when the ſame Fibres which were lengthened by the *Blood* that enter'd into the *Ventricles*, contract and ſqueeze the Blood into the *Arteries*, which dilate as it enters, and when the Point or Cone of the *Heart* approaches nearer its *Baſis*, it becomes ſhorter, and its Cavities narrower.

The *Dilatation* is made at the ſame Time in the Two *Ventricles*, and the Contraction after the ſame manner. The *reſt*, which is betwixt the Two Motions of the *Heart*, and in the *Arteries*, is called the *Periſyſtole*. When the *Heart* contracts it ſelf, the *Cone* approaches the *Baſis* in a ſtreight Line, and the External Fibres deſcend from the *Baſis* toward the Point, and run again from the *Baſis* where they end, bringing a Neceſſity upon the Heart to make a half Turn; which ſhortens it, and makes the Sides of the *Ventricles* come near one another, and forces the *Blood* which is betwixt them to ſpring out; likewiſe we may ſee in our Conceptions of the Motion of the *Heart*, that there is no Need of having Recourſe to the Pulſifick Faculty, if we conſider the Structure of the Part, to believe that it is capable of *Dilatation* and *Contraction* like all other Muſcles.

If we examine the Make of a Water-Mill, we ſhall find ſuch a Parallel Action, one Part with another, that the Water coming to ſtrike upon the Wheel, it turns it round, and at the ſame Time moves all the Parts of the Mill; for the Blood is, in reſpect to the Heart, the ſame that the Water is to the Mill, that it goes ſwifter or ſlower, according as there is more or leſs Water in the Stream to make it go; ſo the *Heart* moves ſwifter, and beats or pulſes oftner, according to the Quantity of Blood, or greater Degree of Heat that makes it flow more readily: We may moreover alledge, That this Heat is according to the Fall which is in the Stream; and to carry on the Compariſon, we may obſerve, that as often as the Water is ſtopt from coming to the Mill, it remains Motionleſs; ſo the *Blood* hindered by any Means from being conveyed to the Heart, it loſes its Motion, and ceaſes.

It is certain then, that the Motion of the *Heart* is owing to the *Blood*, which every Day's Experience will confirm; for if we lay a Hand upon the Region of the *Heart*, of one who has been running or doing any violent Action, we may perceive the Beating more frequent than before, becauſe the Agitation hurries

urries on the Courſe of the *Blood*, and nakes it enter into and flow from the Heart nore ſwiftly; if we feel the Pulſe of a Perſon who has faſted long, we ſhall find he Pulſation feeble, and a great Diſtance betwixt one Beating and another, becauſe he *Blood* being then thicker, it moves ſlowly towards the *Heart*; but after the ſaid Perſon has eat and drank, his Pulſe will nove quicker, becauſe the Motions of the *Heart* encreaſe in Proportion to the *Blood*, here being then a greater Quantity of it, by he Addition of *Chyle*.

The Uſe of the *Pulſe* is to propel through he *Arteries* the rarefied *Blood* from the *Heart* into all the Parts of the Body, in order to their Nutrition, that each Part according to its Function might take a certain Part, and convert it to its own proper Uſe, nd return the Superfluity to the *Heart* again by Means of the Veins, in order to have it rarefied and ſpiritualized anew, whereby it might receive freſh Vigour. The Motion of the *Blood* is called *Circulation*, not becauſe it is ſaid to move in *Circulum*, for that is impoſſible, but becauſe it begins o move by the *Arteries* from the *Heart* to he Extremities, and returns from thence by he Veins, and contains always the ſame *Rout*, without ceaſing, as long as the Animal lives; ſo likewiſe taking Circulation n this Senſe, for a Liquor that returns always to the ſame Place from whence it firſt began to move, we may ſay the ſame, that Rain circulates, becauſe, after it falls upon he Earth, it is evaporated by the Heat of he Sun, and returns again in Showers of Water, and that Water from Springs and Rivers flows inceſſantly towards the Sea, nd is ſupplied back again from thence.

The Cauſe of this Local Motion is not in he *Blood*, ſince it is a Liquor like all others, hat depends upon an External Cauſe to drive t forward; for it is the *Heart* that determines the Motion of the *Blood*, becauſe it being a ſtrong Muſcle, and having vigorous Contractions, it propels the *Blood* to the extream Parts of the Body, from whence it returns to circulate as before. The *Heart* is he *Machine* which makes the *Blood* circulate; t is a Pump that throws the Liquor through he whole Body, and which gives it its circular Motion; when we ſpeak of the Circulation of *Blood*, we do not ſuppoſe that is the only Liquor that flows, for the *Chyle* and *Lympha* circulate together with it; and throughout, where're there are Veſſels, there are *Lymphaticks*; for the *Chyle*, it circulates likewiſe with the *Blood*, but not at all Times like the *Lympha*, ſince it cannot enter but when Digeſtion is finiſh'd, and the Alimentary Fluid begins to be diſtributed; then if you draw *Blood* from the Arm, you will perceive a whitiſh Liquor floating upon it, which is nothing but *Chyle*, but if it appear ſerous, you may then judge that there is a great deal of *Lympha* mixed with it.

This Circulation of the *Blood*, according to *Diemerbroeck*, is prov'd by Three ſtrong Reaſons: *Firſt*, The Quantity of *Blood* driven from the *Heart* into the *Arteries*, which is ſo great, that the Aliment taken in cannot ſupply a Hundredth Part of it, ſince this Pulſation is continued in a Man that has faſted Two or Three Days together, as well as he that has fed heartily the ſame Time; likewiſe, if the *Blood* did not return from the *Arteries* of the *Heart* by the *Veins*, this Matter which ought to be pulſed out would remain in the *Heart*, otherwiſe the Arteries would burſt, or the Parts in which the *Blood* flowed would be tumefied after a ſtrange Manner: In ſhort, the *Heart* of a ſound Man of a grown Age beats Three thouſand Times, or more, in the Space of One Hour. If at every Pulſation it pulſed out into the *Aorta* only a Scruple of *Blood*, we might find by Computation that in every Hour there paſſed through the *Heart* at leaſt Eight or Nine Pounds of *Blood*, and in Four Hours, Thirty or Forty, according as the *Heart* beat more or leſs; beſides, if we conſider the Quantity of *Blood* when we open a Vein of the Arm that flows preſently out of the Orifice, and make a Computation how much at the ſame Time paſſes through an infinite Number of other Veins, in which the Courſe and Circulation of the *Blood* is not ſtop'd by the Ligature, all that *Blood* generally paſſes the *Heart*; we may eaſily perceive, that at each Pulſation, there is not only driven from the *Heart* into the Great *Artery* a few Drops, a Scruple or a Dram or Two, but a great deal more, perhaps half an Ounce or better.

Se-

Secondly, This *Circulation* is proved from the Situation of the *Valves* in the Veins, which is ordered or disposed, that the *Blood* flows easily and freely by them in the *Vena Cava*, and from the *Vena Cava* into the small *Veins*; at the same Time, if by a Pipe we fill the *Vena Cava* full of Wind, there will none of that enter out of the *Vena Cava* into the small *Veins*; but on the contrary, if we blow into the lesser *Veins*, it will enter into the larger, and from thence into the *Vena Cava*.

Thirdly, This is prov'd from the *Ligature* in *Blood-letting*; so that if we tie the Arm or the *Leg*, and beneath the *Ligature* open the *Vein*, it shall swell underneath, because the *Blood* which is pulsed forward by the *Arteries* to the extream Parts returns by the *Veins* and mounts upwards, and when it comes to the *Ligature*, it is stop'd there, and makes the Vein swell below; and when the *Blood* can pass no further, it is constrain'd to flow through the Orifice; but as soon as we loose the Binding, this Flux ceases, because it is then easier for the *Blood* to rise through the Channel of the Vein, whose Hollow or Capacity is large or open enough for its Passage, than to flow through the Orifice which is streighter: We ought to add this Observation, That if we make the Ligature so tight that the *Blood* cannot pass into the Parts from the *Artery*, then it ceases to bleed any longer by the Orifice made in the *Vein*, because the *Ligature* stops the Motion of the *Blood* through the *Artery*; but if we loose the Bandage a little, so that there is Liberty for the Pulsation of the *Artery*, the *Blood* runs afresh from the Orifice: Besides, every *Ligature* or Compression of the *Veins* and *Arteries* made on Living Animals, shows plainly that the *Blood* is pulsed or driven from the *Heart* into the Parts by Means of the *Arteries*, and that it returns to the *Heart* by the Veins; for the *Arteries* being tied, swell above the *Ligature*; that is, towards the *Heart*, because the Passage of the *Blood* is stop'd, and the Veins on the contrary flag or are emptied, because the *Blood* readily flows from the Tying, and returns to the *Heart*, and on the other Hand swells below the Ligature.

The *Modus* of the Circulation is perform'd after this Manner: The *Blood* flowing impetuously from the Left *Ventricle*, is forced by the Contraction of the *Heart* into the Great *Artery*, the more refin'd Part of the *Blood* rising upwards by the superiour Trunk of the *Aorta*, and distributes it self to the Arms by the *Axillaries*, and to the *Head*, by Meditation of the *Carotid* and *Cervical Arteries*; on the other Hand, the grosser Part descends by the lower Branch of the same *Artery*, and distributes it self to all the Parts below the Heart, by the Celiack, Mesenterick, Emulgent, Spermatick and Iliack Arteries, and by a vast number of other Branches.

The *Blood* then being conveyed and distributed as well upwards as downwards by the Two Trunks of the *Aorta*, to all the Parts of the Body, it flows to the Extremities of the small *Arteries*, and is there extravasated for the Nutrition of all the Parts, and all that is extravasated from the *Blood* is not spent entirely upon the Nutrition, what remains enters into the Orifices or Mouths of the Capillary *Veins* by the Impulsion of new *Blood*, that flowing continually from the lesser *Arteries*, obliges that which passes before to return by the minuter *Veins* into the larger: The *Blood* which is sent into the *Head* makes its Return to the *Heart* by the *Jugulars*; and that of the Arms, by the *Axillaries* into the *Subclavians*, and from thence into the upper Trunk of the *Vena Cava*. The same is likewise done with *Blood* sent into the inferiour Parts; it returns to the *Heart* by the *Iliacks*, and all the Veins of the *Lower Venter*, which disimbogue themselves in the descending and ascending Trunk of the *Vena Cava*; and likewise all the *Blood*, as well in the upper as lower Parts, meet and unite in the *Vena Cava*, and proceed to empty themselves into the Right *Auricle* of the *Heart*, and from thence into the Right *Ventricle*, from whence it is pulsed out as often by the Contraction of the *Heart* that obliges it to enter into the *Pulmonary Artery*, not being able to return into the *Vena Cava*, by reason of the Formation of the *Tripuscide Valves*.

The *Artery* of the *Lungs* having received the *Blood*, carries it to the *Lungs*, and there distributes it through the whole Substance of them, from whence it passes afterwards, with the more subtle Part of the Air, brought

brought thither by the Extremies from the *Trachæa* into the Branches of the Pulmonary Vein, which conducts it to the Left *Auricle* of the *Heart*, and from thence into the *Ventricle* on the ſame Side. And as the *Blood* cannot return back again by the Way it enters, by reaſon of the Situation of the *Valves* in that Vein; it flows impetuouſly from the *Ventricle* by the Contraction of the *Heart*, and enters into the great *Artery*, which diſtributes it thence to all the Parts of the Body, from whence it is again brought back to its Spring-Head, through the little Veins into the larger, and from thoſe into the ſuperior and inferior Trunk of the *Vena Cava*, to renew its perpetual Circulation, which ceaſes not but with the Life of the Animal, or rather, to ſpeak more properly, the Life of the Animal ceaſes, if this Motion diſcontinues but for a Time; and the *Blood* flows in this Manner not only to renew the Maſs, which without this continual Agitation would corrupt and decay, but alſo to purify and ſubtilize it from its Excrements; and, in a Word, to render it more fit for the Nutrition of all the Parts of the Body.

But as this Maſs waſts conſiderably by the Loſs of Spirits, which are employ'd upon the Nouriſhment of the Parts, or that continually perſpire through the Pores of the Skin, which drains it off inſenſibly, if it was not daily ſupplied by the Chyle with freſh Blood and Spirits fit to recruit it. The *Heart*, ſays a Modern Author, is in the middle of the Body, like a Wheel or Water-Engine in the middle of a Garden, that is placed there to convey Water to all Parts, by an infinite Number of little Streams that are appointed to Water every Quarter: The Canals that brings the Water through the Gardens, are like the Veins that carry the *Blood* to the *Heart*, but the *Arteries* are juſt like the Conduits which ſupply all the Garden with Water, for theſe Conduits do not contribute as the efficient Cauſe to the Motion of this Water, whereas the *Arteries* give a great Aſſiſtance to that of the *Blood*, ſince their carnous and circular Fibres are like moving Rings; which, by their Contraction, drive forward the *Blood* which they encloſe. The Water which ſtays in the Quarters, or ſeveral Parts of the Garden for the Nutrition of the Plants, is like the *Blood* which remains upon the Parts for their Nouriſhment; and the Water that is brought again to the Ciſtern, and not imploy'd in watering the Ground, is like the *Blood*, which not being beſtowed upon the Nutrition of the Parts, returns to the *Heart* by the *Veins*.

The *Heart*, ſays Mr. *Duncan*, is like the Sea of this little World; the Agitations of the *Blood* are as the Flux and Reflux; the Paſſions like Storms or Tempeſts; the *Arteries*, which carry the *Blood* from the *Heart* to other Parts, are like the Subterranean Channels, or the Waters that come from the Sea; and the *Veins* which bring back the *Blood* to the *Heart*, are in ſhort, like the Rivers and Rivulets, which convey it to the Sea again; ſo that the Little World, as well as the Great, is divided into Sea and Land: The Fluids are like the Waters, and and the Solids dry Land; or, we may ſay on the other Hand, that the Earth is like a great Animal, whereof the Sea is like the *Heart*; the Subterranean Channels which receive the Water from the Sea, repreſent the Arteries; and the Rivers which flow back, like the Veins; the little Pipes which carry the clear Water from the Fountains, are like the Lymphaticks of a great Animal; in ſhort, the Motion of the Waters from the Sea to the Land, and thoſe from the Land to the Sea again, is a very expreſſive Image or Reſemblance of the Circulation of the *Blood*.

Some will pretend to affirm, That it is not difficult to explain how the *Blood* paſſes from the *Arteries* into the *Veins*, ſince there is an *Anaſtomoſes* betwixt them; but theſe Communications of the *Arteries* with Veins are not conſonant to Reaſon, and they only aſſume to know what they cannot diſcover; at the ſame Time they ſuppoſe with the Ancients, that it is impoſſible for the *Blood* to extravaſate the *Arteries*, and enter into the *Veins*, but that it continues its Motion by the largeſt, ſtreight and open Ways, and never enters into the narrower crooked Paſſages; ſo that, according to this *Hypotheſis*, there can be no Separations or Filtrations in the Glands, becauſe the Blood paſſes directly from the *Arteries* into the *Veins*. We ſhall ſtrengthen our Arguments againſt the

Anaſto-

Anaſtomoſes of the *Arteries* with the Veins by Two undeniable Experiments: The Firſt is, If we make an Inſpection of warm Water into the *Artery* of the Arm upon a dead Body, and afterwards make a Ligature on the Vein that accompanies it, then prick the Vein, and you will find that the Water will not flow, though all the Arm and Hand were fill'd before. In the next Place, If you Syringe an *Artery* with red Wax, or what you will, and make alſo an Injection of another Colour into that Vein which anſwers to the *Artery*, you will have the Pleaſure to ſee all the Capillary Branches and the Subſtance of the Part penetrated with the Wax; but you cannot find any where the Two Injections mix'd together, and the Wax confuſed or jumbled together in paſſing by a common Canal from the *Artery* to the Vein: Theſe Two Experiments ſhow plainly, that there is no *Anaſtomoſes* of the *Arteries* with the *Veins*.

The *Blood* of the *Arteries* which paſſes into the *Lungs* is ſo exalted and brought to Perfection, that that which is carried to the Brain ſerves for the making of Animal Juice; that which goes into the *Parotide* and Maxillary *Glands*, for the Separation of *Saliva* or Spittle; into the Glands of the *Oeſophagus* or *Stomach*, for an acid Liquor; into the *Pancreas*, for Pancreatick Juice; into the *Liver*, for *Bile* or *Gall*; into the *Reins*, for *Urine*; into the *Teſticles*, for *Semen*; and into the *Breaſts*, for *Milk*; in ſhort, it gives to all the Parts Moiſture to allay the Heat, and is the Cauſe of that Vital Motion we obſerve: From hence it is that the Parts deprived of *Blood* periſh, and dry up like Plants that are deprived of their Sap; as for the *Blood* in the Veins, it is of this Advantage, that it preſerves Heat to the Parts through which it paſſes. For the reſt, it is eaſy to ſee that the Circulation maintains the Fluidy, and without that Motion it could not be fit for Nutrition, but would turn to a grumous Serum.

The *Blood*, according to *Diemerbroeck*, is a red Liquor made from *Chyle* in the *Heart* and the *Lungs*, for the Support of the whole Body; it is compoſed of Two different Juices, and of *Serum*, which is of a middle Nature betwixt both. Of the Juices, the one is *Sulphureous*, and the other *Saline*; the *Sulphureous* is ſomething greaſy, oily and viſcous; from whence it comes, that in Diſſolution it will not ſo well mix and unite together, without ſome Loſs and making Noiſe, except there intervene ſome *Mercury* which is ſo familiar to the Nature of oil and the other, that both their Powers are exactly mix'd with it, and in it; for this *Mercury* is the ſame *Serum*, in which, by the Means of Coction or Boiling, the more aqueous Particles of the Juices are diſſolv'd and mix'd together; likewiſe the *Serum* is compoſed not only of the aqueous or watry Part of the Aliment, but alſo of ſome *Sulphureous* and *Saline* Parts, blended in Fuſion; ſo it partakes of a Temperament betwixt both, in ſuch a manner, that the Mixture and Union of the Two Juices is made of a good Texture therefrom; and it is for this Reaſon that it be well concocted and mix'd with a due Quantity of other Juices; for if it is in too ſmall a Quantity, or that it want entirely its active Principles, to wit, the Saline and Sulphureous Juices united to ſtrictly, they act with Violence and oppoſe one another, and by this Struggle or Oppoſition they break aſunder and conſume by Way of Colliquation; whence it comes that the Body waſts and grows lean, being deprived of its Aliment, or that the Aliment corrupts, becomes Morbifick, and in the End decays: But if on the contrary the *Serum* is too watry, crude, and in too great Plenty, then the ſame active Principles ſeparate themſelves, and are too remote from one another, and their Union becomes too lax, ſo that they do not ſupport one another, or act ſufficiently; whence it comes that the *Blood* is too humid, and is ſubject to Corruption, and all the Body being nouriſhed from ſuch *Blood*, is render'd weak and languiſhing.

In this Mixture of the *Sulphureous* and *Saline* Juice in the *Serum*, the Sulphureous Juice gives it its Aptneſs of Action, but the *Saline* Juice is that which affords the chief Conſiſtence; for being of a more fix'd Nature, it prevents the Sulphureous Juice that is mix'd with it, and clings to it by its Particles from diſſolving ſo eaſily: It likewiſe retards Diſſolution of the Maſs of *Blood*, and reſiſts very much Rottenneſs, Corruption and Inflammation; and as it has a Di-

poſitio

poſition or Tendency to be fix'd, it happens from thence that the *Blood* that is ſpread over the Subſtance of the Parts is coagulated, clings to, and becomes aſſimilated to it.

The *Blood*, according to *Willis*, has Five Principles, *viz.* Spirit, Sulphur, volatile Salt, Earth, and Water: The Spirit retains the *Blood* in a juſt and natural Temperament that agitates it, being chiefly aſſiſted by the Heat of the *Heart*, and in the Action, if it becomes Victorious, it drives away all Exotick Bodies that mix themſelves with the *Blood*, and makes it truly Homogeneous; they call *Sulphur*, the oily Parts of the *Blood*, that are confuſed amongſt the reſt, but ſmoother, and are the Cauſe of the Greaſe that we ſee throughout the Body, in Inflammations and exceſſive Heats, that happen in Fevers; and in ſhort, of the very Redneſs of the *Blood*, ſince they are Sulphureous Bodies that give this Colour to their Diſſolvants, call'd in Chymiſtry, *Menſtruums*. The *Volatile Salt* is the Third Principle of the *Blood*, which hinders Crudity and Corruption, except when the Salt is too ſtrong, as in the *Scurvy* and *Quartan Ague*, or elſe too ſharp, and more apt for Coagulation, is in the *Gout*, *Leproſy*, and ſeveral *Chronick* or obſtinate Diſeaſes. In the *Blood* we find twice as much of Water as other Principles, which gives it its Fluidity and Coolneſs.

There is in the *Blood*, according to Modern Authors, fatty Particles, that compoſe or make up the Balls or Globules of the red Part, that turn upon their own Centre a thick *Lympha*, that contains in it a great deal of Jelly, proper for the Nutrition of the Parts, and the Aqueous and Saline Part of the ſaid *Lympha*, that flows by *Urine*.

The *Whitiſh Jelly* that floats upon Humane *Blood*, when drawn from the *Vein*, is not from the Pituite, as is not yet well aſſimilated to it; from whence comes the Obſervations made on *Blood* that is white as Milk, and taken from healthful Men, which is nothing but *Chyle*, that has been ill changed. The ſame *Fibres* of *Blood* that appear red, are really white, and come from *Chyle*.

Sanguification, according to late Authors, is nothing but a Purification of the *Chyle*, not only by being freed and diſengaged from ſeveral Particles in the Glands, but likewiſe by paſſing through the *Lungs*; where the *Air* modifies anew. In ſhort, they explain *Sanguification* after this Manner: The *Chyle*, in paſſing through the Glands, is filtered, or rather it is changed into ſeveral Subſtances; the one is gluey like that of Jelly, the other is liquid like Water; there is beſides another which is Fat and *Sulphureous*, but it muſt paſs ſeveral Circulations before the *Chyle* can be freed from this fat or greaſy Part; for it remains a long Time in the Veſſels under firſt Form. At firſt, when the Saline and Sulphureous Particles come to paſs by the Lungs, the Elaſtick Vertue of the Air turns them round; and after having traverſed ſeveral Times the *Veſſicules* of the *Lungs*, they are all changed into little firm Bladders, to preſerve their Figure round, and to turn upon their *Centre*; in ſhort, it is the Maſs or Heap of all theſe little Balls, that gives this fine Scarlet Colour to the *Blood*.

What would perſwade us that the Sulphureous Part acquires that Modification in the *Lungs* is, that the *Blood* that flows from thence is always florid and full of Froth, but the moſt convincing Proof that the Redneſs of the *Blood* proceeds from thoſe little Globules, is when you ſee it whirl round in a Criſtaline Liquor, by obſerving the Blood while it is yet hot with a Microſcope: This Motion continues as long as the *Blood* remains fluid, but as ſoon as it is coagulated, the Globules ceaſe to turn, they appear cloſe together and loſe their round Figure, which is that that makes the *Blood* look black: It is alſo the ſame Cauſe that makes the *Blood* in the *Veins* always leſs red than that in the *Arteries*, becauſe that the Cavity of theſe little Globules, not being ſo much extended or ſtretch'd as they were in the *Lungs*, by the Spring of the Air; which, if it is weak, they ſhrink up, but as ſoon as ever the *Blood* paſſes again through the *Lungs*, the Diſorder and Confuſion they were in before is recovered, and by the Circular Motion the Spring of the *Air* communicates to them, they are ſwell'd or blown up again, which makes the *Blood* appear ſo red from the Rarefaction that the Light gives by the Modification of the Rays ſhining athwart them.

The *Redneſs* and *Liquidneſs* of the *Blood* then depends on theſe little Globules and their Motion, for we cannot well be perſwaded that theſe little Globules are of that Colour, though they appear red, if we obſerve them apart, for then they look as tranſparent as Criſtal, they are not then red of themſelves when ſingle; but when ſeveral of them are together, the Light which runs croſs breaks it ſelf under certain Angles, which makes it appear red, after the ſame Manner as Water forms the Rainbow when the Light falls athwart it.

The Red Colour of the *Blood* depends on the Action of the *Air* that touches the *Blood*, and modifies the *Superficies*, after the ſame Manner as we have ſhown that the Light makes it appear red; likewiſe the *Blood* of the *Veins*, which is black, is not ſo from the Air, which forms upon it a Pellicle or Skin of a Scarlet Colour. If we ſtir Blood with a Stick, this black Colour will turn to a fine Red, only by the Communication of the *Air*: The ſame Thing happens to the Blood of the Arteries; for, when it is coagulated, there is nothing but the *Superficies* of it, which the Air affects that is red, the reſt is always blackiſh.

During the Time that all the Humours run through the Body, and that the fatter and more ſulphureous Particles change themſelves into little Balls, the Remainder of the *Chyle*, by the Force of Circulation, diſſolves and melts them, and the Air which it receives in paſſing into the Lungs changes it into a Subſtance, which has no more Motion or Activity than thoſe Particles which ſerve to make the *Blood* red. This Liquor is of ſuch Importance, that without it we can have no Subſiſtence.

We may enquire from whence it comes, that in great fat People, in whom there is abundance of Sulphureous oily Particles of the *Blood*, that are hotter than others, yet notwithſtanding have leſs Agility of the whole Body, and leſs Activity of the Animal Spirits; but on the contrary, theſe Perſons are very idle or lazy, more ſubject to Sleep, and much addicted to the *Apoplexy*, *Carus*, *Aſthma*, and other the like Affections, than thoſe who are lean. *Diemerbroeck* anſwers, that this proceeds from hence, that in groſs Bodies the oily Sulphureous Particles exceed very much in Quantity the Saline, which are embarraſs'd and blunted by the oleaginous Fat of the other, ſo that they are not ſubject to be inflamed, attenuated, or ſufficiently ſpiritualiz'd; which makes it, that they are leſs diſpoſed and leſs proper to generate ſo large a Quantity of Animal Spirits, which are the principal Cauſes of the Agility and Activeneſs of the whole Body; and likewiſe, not procuring a ſufficient Quantity the Animal Actions become lax and ſlothful, and are ſucceeded by ſleepy Indiſpoſitions; add to this, that the Heat of the *Sulphureous* Parts is in it ſelf as it were benum'd, and is not much animated except by the Aſſiſtance of the Acrid Saline Parts; it raiſes no Effervescence in the *Blood*, but by a Motion of the Particles amongſt themſelves. But if the fat Sulphureous Particles predominate too ſtrong over the Saline, that they obſtruct, blunt and weaken the Points, the Particles ſo affected cannot raiſe themſelves to a Point, or act in Fermentation. They may object perhaps here, that in Feveriſh Indiſpoſitions the Sulphureous Heat lies above; yet notwithſtanding the Animal Actions are not always looſe and benum'd. The ſame Author anſwers, That this proceeds from hence, that in Feveriſh Affections, the Sulphureous oily Parts of the *Blood* do not exceed the Saline, and blunt them by their Quantity or Oilineſs, but that they encreaſe their Acrimony, and act more powerfully, cauſing an Effervescence, either too violent, irregular, or feveriſh.

The *Blood*, ſays the ſame Author, forms to it ſelf, by proper Fermentations and Concoctions in the *Viſcera*, Two Sorts of Spirits, to wit, the Sulphureous, and the Saline; the one ſweet, the other acrid, both of them very fine and ſubtile, the Sulphureous notwithſtanding being more volatile than the Saline. *Chymiſtry* ſhows us the like Spirits both from one and the other; ſuch are the Sulphureous Spirits which are obſerved in the Chymical Oils drawn from Vegetables, and the Saline Spirits, which are likewiſe drawn from Salts and Saline Things: That *Sulphureous Spirits* are more ſubtile and volatile than the *Saline*, is evident in the Diſtillation of Vegetables; for theſe ſeparate firſt of all, and riſe eaſily in the *Alembick*, if they

they are not hindered and tied down by the Saline.

These Two Spirits mix together in the Mass of *Blood*, from whence they are raised by Fermentations; and being from Time to Time carried with it into the *Heart*, and many Times attenuated and dilated together, they are united so exactly, that at last they become entirely one Spirit, which we call *Vital*. For the Vital Spirit is the more subtile and efficacious Part of the *Blood*, composed of *Sulphureous* and *Saline Particles*, dilated and united together by the Fermentation which is made in the *Heart*: It is said to be the most subtile and efficacious Part of the *Blood*; that is to say, such as is drawn from the Sulphureous and Saline Particles, for that is not fit to be called Spirit whose Substance is only a subtile Vapour, such as that that is raised from the serous Part of the Blood, which has no Power to promote Action; but being mix'd too plentifully, it breaks and lessens the Action and Force of the Spirits, and opposes their Activity.

When the *Blood* immediately sinks in the *Heart*, the Connexion of the Parts throughout the Liquor is dissolv'd; by this Dissolution the Spirituous Particles unite themselves, strictly together, and being thus united, they endeavour to separate themselves and extend on all Sides; but being confin'd within the Vessels, they are jumbled together with the rest of the Liquor, and likewise thrusting themselves forwards, and springing forth with Violence into the open Mouths of the *Arteries*, they expand or spread jointly with the *Blood* throughout all the Parts of the Body, and convey their Heat.

The *Vital Spirit*, in the Efforts it constantly makes to fly away, because of its extream Volatility, agitates continually the other grosser Particles of the *Blood* in which it is confined, and excites it self different Ways; but as its Passage is obstructed by the different Shocks it suffers in its Repercussions, it disunites the Particles, removes one from another, alters, subtilizes and makes a continual Motion of Fermentation; from which, and likewise from the Agitation of the subtile Matter, proceeds the Heat of the *Blood*; which, when the Agitation is moderate, is likewise so, and when otherwise, is accordingly affected, being as the various Alterations happen, either hotter or colder.

By this Motion also, that is raised by the Spirit, the *Blood* is not only preserv'd in its Heat and Texture, that is to say, a perfect Mixture, but it is likewise render'd fluid and proper for Nutrition: And if on the contrary it is destitute, or wants this Motion and Spirit, it thickens, coagulates, decays or corrupts, and becomes at last entirely useless; otherwise this Spirit, by its Motion or Agitation, attenuates the Blood so much, that it makes it capable of insinuating and passing jointly with it, into all the streight and narrow Passages of the Body, all which it excites to perform the Actions and Functions which they are design'd for; likewise the same Spirit, which by its continual Agitation and Heat, dissipates without ceasing, and destroys the more fluid Particles of the Parts, perpetually supplies them with others in their Room.

Willis and *Rohault* say, That they judge it very like to the natural Heat which is in us, attributed originally to the *Blood*, and they conceive it to be like that which proceeds from the Mixture of Two Liquors; for Example, from the Mixture of Oil of Tartar with Oil of Vitriol. For when the Parts of the *Blood*, which being rarefied in the Cavities of the *Heart*, are flowing to enter into the Venous *Artery*, and in the *Aorta*; the little Blood that remains then in the Cavities, and that which falls anew from the *Auricles* of the *Heart*, possesses the Place of the Two Liquors, and that which comes from the Leven of the other, to make it dilate: From hence it is manifest, that the Heat which communicates it self to all the Parts of the Body, by the Means of *Blood* which comes continually from the *Heart* by the *Arteries*.

To know how the Vital Spirits form themselves, says Mr. *De la Chambre*, we are to suppose that the *Blood* that is in the *Vena Cava* enters into the Right *Ventricle* of the *Heart*, where it is warm'd by the Heat and Motion of that Part which is the hottest of all the Body, and after that flows boiling hot, and smoaking into the *Lungs*, where it meets with the *Air* that is brought by Inspiration; which, by its Coolness and Thick-

neſs, the Fumes that exhale from the Parts, and which are no other than the very Spirits, whereof they are full, and that by leſs Heat ſeparate and exhale, after the ſame Manner as is done in Diſtillations of *Aqua Vitæ*, where cold Water is placed round the Receiver to condenſe the *Vapour* into a Body; for which Reaſon the *Vein* that carries the *Blood* ſmoaking into the *Lungs*, is as thick as an *Artery*, in order to hinder the Diſſipation that might be made before it be cool'd; on the contrary, the *Artery* which receives the *Blood* after it has been refrigerated, is as thin as a *Vein*: And perhaps this is the Reaſon why this *Artery* has but Two *Valves*, inſtead of Three, which all the other Veſſels have that enter the *Heart*; for as the *Valves* are made for no other Uſe than to hinder the Impetuoſity of the *Blood* from entering the *Heart*, and there being not ſo much Want of *Valves* in the *Arteria Venoſa*, there are but Two, becauſe the *Blood* is cooled and temper'd by the Air, which is mix'd with it in the *Blood*.

After the *Blood* which flows from the Right *Ventricle* has traverſed the *Lungs*, it diſcharges it ſelf into the Left, where it is mov'd and agitated afreſh, and where the more ſubtile Parts refund themſelves after ſuch a Manner, that they require all the Diſpoſitions neceſſary to make the Vital Spirits. As theſe Things preſerve themſelves by ſuch Things as are natural to them, and Motion being natural to the Spirits that are of a fiery Nature, they muſt be kept perpetually in Motion like that Body, for we cannot ſtop the Motion of Fire with extinguiſhing it; and every Thing that hinders the Spirits from Motion, as *Narcoticks* and *Plenitude*, deſtroys the Animal. It is then from the Providence of Nature, the Inventor and Author of every Artifice, that the Vital Spirits are continually agitated, in order to preſerve and continue what is moſt proper and natural for them: And we cannot find any Thing more commodious than the Motion of the Heart and the *Arteries*; which excite, quicken and revive, every Moment the Spirits that are mix'd with the *Blood*; for as this Humour is groſs and heavy, there is Danger it would be ſtifled by its own Weight, if this wonderful Spring which puts the *Arterial Blood* in a continual Motion, did not prevent that Miſchief; and for this Reaſon the *Arteries* attend the great Veins, that their Action and Weight may raiſe the Spirits that are mix'd with the Blood.

When the *Blood*, ſays *Diemerbroeck*, is made up of a *Sulphureous* Principle, and a *Saline* one, mix'd together in due Proportion, it is very good and naturally well temper'd; but if the Strength of one of theſe Principles exceed that of the other, then the *Blood* becomes too cold, or too hot, and we ſee according to their Exceſs ſuch or ſuch a Temperament prevail; for 'tis ſaid too cold, not but the Quality which we call Cold proceeds from Salt, or Spirit of Salt, as its proper Subject; but this is ſo, that if the Salt predominate, the Sulphureous Spirit is not much blunted and coagulated; from whence it comes that the Motion and Agitation of the ſmall Particles amongſt themſelves is leſs, whence it muſt neceſſarily follow, that they leſs excite the actual Heat. Add to this, that the Salt or Spirit is not called cold, that becauſe being thrown into the Fire it only crackles, and does not flame as if made of *Sulphur* or Spirit of *Sulphur*.

Now the *Blood* compoſed of theſe Principles creates a leſs or greater Quantity of Spirits; for if the *Blood* that with the *Chyle* ought to be rarefied in the *Heart*, be well concocted in the other *Viſcera*, and well diſpoſed to be fermented, or rather to be exalted to a perfect Maturity, then if a juſt and equal Effervescence, or Dilatation in the *Heart*, which raiſes a moderate Heat, and produces a convenient Quantity of Spirits; but if the *Blood* for ſome Cauſe or other is not ſufficiently or fitly prepar'd, and remains crude, its Effervescence and Dilatation in the Heart are leſs, and it cannot raiſe the Spirits; from whence follows an intemperate Coldneſs of the whole Body, which if on the contrary, it be too much concocted, and the Particles whether *Saline* or *Sulphureous* being mix'd together, and too much attenuated when it is rarefied exceedingly in the Heart, and creates Spirits too hot and acrid; from whence proceeds a too hot Intemperance or Exceſs throughout the whole Body, a Corruption of Humours, Inflammations, Fevers eſpecially, if the Sulphureous Spirits prevail upon the Saline.

The

The *Fermentation* of the Maſs of *Blood*, ſays *Etmuller*, is diſturb'd ſeveral Ways, ſometimes by Exceſs, and then the Effervescence is dangerous, which is known by the *Pulſe* being large and quick, and attended with an inordinate Heat throughout the whole Body, and is the uſual Original or Source of all acute Diſeaſes. Sometimes it is diſturb'd or injur'd by a Defect or Want of Spirits, and then the *Pulſe* is ſmall, ſlow and feeble, the Body is as it were lukewarm, and all the Functions are languiſhing, as it appears eſpecially in Cronick Diſeaſes. In ſhort, the Fermentation of the *Blood* is injured ſeveral other Ways; from whence it comes that the Inequality and Diverſity of the *Pulſe*, and other Parts of the Body, which is ſometimes hot, and ſometimes cold, ſometimes red, and ſometimes pale, eſpecially the Face.

The efficient Cauſe of all the vitiated Fermentations is the Vital Spirit, as the Firſt Author of Inteſtine Motion, but the Material Cauſe is the Fault of the Contexture, Proportion and Harmony, of the ſmall Saline and Sulphureous Particles of the Blood, which proceed ſometimes from the Non-naturals, eſpecially the Aliment or Food; ſometimes from an Hereditary Vice, by reaſon ſome old People beget weak and diſeas'd Children; ſometimes from ſome foreign or contagious Ferment received in with the Air by Reſpiration, or otherwiſe.

When the *Saline* Particles of the *Blood* are not well temper'd by the oily, they become more acrid, conteſt together with greater Violence, and make a very ſtrong Effervescence; as it happens in Burning *Fevers*, Plurify, Quinſey, Meaſles and Small Pox. And when the ſame Particles are too temperate, and as it were ſuppreſs'd or over-power'd by *Crude Chyle*, they volatiliſe with a vitiated Acidity, then the Fermentation is too ſtrong, as may be ſeen in *Cachexia* of Men and Women, the *Leucophlegmatia* and *Anaſarca*.

If it happen that the *Acid* and the *Alkali* are too much remov'd from the Natural Conſtitution, that the one acts too much upon the other, the Fermentation is almoſt entirely loſt; for if the Acid prevail, the Maſs of Blood is coagulated, and the Body is affected with *Syncopes*, and ſometimes Death it ſelf; and if Urinous, it is eaſily diſſolvable, as the Infuſion of Liquors demonſtrate: But if theſe Salts are deſtroyed any other Way in mixing together, or with other Particles, ſo that they gain a ſtrange Savour, then Hyſterick Affections, Scurvy, Hypochondriack Melancholy, Jaundice, the Pox, and ſeveral other grievous Diſtempers enſue.

As the ſubtile Particles of Wine ſtop'd cloſe in a Veſſel, as *Willis* ſays, agitate and mix perpetually one with the other, till they ſeparate from their Subſtance all the Heterogeneous Corpuſcles; ſo that their Action is ſometimes ſo ſtrong as to make Way through the hardeſt Bodies: The Vital Spirits likewiſe confin'd in the Animal, makes ſuch a Motion and Circulation as never ceaſes, that ſtirs up all the Maſs of Humours, which it drives away through the ſmall or larger Apertures, according as the ſame Humours are foreign or diſagreeable to its Subſtance; and if it is obſtructed, it ſometimes breaks the Veſſel, or only makes a Flame or violent Burning, and make the Animal perceive thoſe Effects we call a *Fever*.

As Wine and moſt other Liquors have their Crudities and their Beginnings, their Maturity and Perfection, their Badneſs and Goodneſs, the *Blood* in like Manner has the ſame, according as the Spirits are hem'd in by the *Chyle*; as they are diveſted, as they evaporate and are exhauſted from the Animal. The Crudity of the *Blood* appears in ſound or healthful Bodies, when after eating they perceive a Weight, Oppreſſion and Indiſpoſition to Action. It appears beſides in Dropſical Patients, in thoſe who have pale Complexions, that are ſubject to Intermitting Fevers or Agues, and generally in thoſe who have their Blood full of Water, Salt, Sowerneſs and Indigeſtion. The Maturity of the *Blood* appears ſome Hours after Victuals, when by the changing of the Food into *Blood* and Spirits, we are ſenſible or feel the Force and Vigour of it; the End appears in the length of Faſting and Labour, or otherwiſe from the Digeſtion or Concoction, that renders the *Blood* either Bilious or *Melancholy*.

Milk is compounded or made up of Three Sorts of Subſtances; which are, *Cream* or

But-

Butter, *Cheese* and *Whey*, otherwise call'd, *Serum*. The *Whey* will *coagulate* or curdle again, because it contains several Parts of *Butter* and *Cheese*. It is also the same Thing of *Blood*, if it is not entirely broke from its natural Constitution; in short, if we take it and set it to cool, we may see at the Top the purest and most florid Part, which we may call the Cream, or the Flower of the *Blood*; there is besides a red Substance, composed of Filaments, Fibres and small Bodies, reciprocally join'd together; this Part of the *Blood* answers to Cheese, these Serosities separate from Two other Sorts of Bodies more gross that swim upon them, and like *Whey* will coagulate again; if we set this Liquor to the Fire, it gains a Colour and Thickness like the White of an Egg; if we mix with it any sharp Liquor, it thickens and grows white: Some for this Reason believe, that that Liquid and serous Part of the *Blood* we now speak of, is that which nourishes all the Body, and that the other Substances which compose the Mass of *Blood* are only the Vehicle of the Heat and Spirits. Nevertheless, *Willis* believes, that the *Blood* like Water nourishes the Nervous Parts, and those that are commonly called *Spermatick*, as it is thought that the Fibrous *Blood* nourishes the *Parenchyma* and the Muscles: *Erasistratus* and the *Greeks* call'd that the *Parenchyma*, which they fancied were made from the immediate Infusion of the *Blood*, as the Liver and Lungs.

The *Blood* appears faulty or defective; sometimes in its white, green or yellow Colour, and sometimes in its Consistence and Fluidity; its Colour is white, like sodden Flesh, and a kind of Decay: It is like that of a *Citron*, by the Mixture of *Salt* and *Sulphur* or *Gall*, or some other Liquor, like that of the Infusion of *Sena*; in short, it is black when the *Blood* is dry and burnt, or otherwise earthy. Its Consistence is sometimes without Water, as in *Hecticks*; sometimes with too much Water, as in *Dropsies*; sometimes it is like *Broth*; sometimes, in short, the *Blood* is coagulated, not only after it is drawn from the *Vein*, but while it is confin'd in the Vessel; and from hence it is the Cause of abundance of Disorders, as *Pleurisy*; for Example, *Quinsey*, *Peripneumonia*, *Dysentery*, both Sort of Poxes, Plague, and all malignant Distempers.

It is certain that the Agility and Readiness of the Spirits, the Volatility of the Salts affecting the *Blood* in a perpetual and natural Agitation, attenuate and mix all that enters into its Substance; and in short, produces the same Effects, that every Body may observe in Wine. There is this Difference betwixt Wine and *Blood*, that the Blood suffers or undergoes, without Discontinuation or Age, a Renovation of its Parts, a Reception and Expulsion of divers Bodies, and that it is never the same. On the contrary, that the Times of its Crudeness, of its Concoction, and its Defect in respect to the different Bodies which are contain'd in it, are undoubtedly the same. These Things cannot be done without *Leven*, that depend either on Art or Nature; the Digestive or Aperitive Remedies, like those taken from Steel, are artificial; the sharp Liquid contain'd in the Stomach, that which is in the Spleen, the Vigour of the genital Parts; in short, the Heat of the *Heart*, in which the *Blood* enters like a gentle Spring, but flowing like an impetuous Torrent, forms a Ferment or Natural Leven. The first and principal Effect of this Fermentation, is the Conservation of the *Blood*, and the Separation of the Excrements.

The preternatural and feverish Motions of the *Blood* proceed from the *Blood* being ill disposed or distributed in the Heart and Vessels, like Water over the Fire, or rather like some Liquor full of burning *Sulphur*, for then it casts off a Scum and Fume with a Force and Strength able to destroy the Animal; it raises the *Pulse*, spreads a burning Heat on every Side, and drives with Violence all before it. The Cause of this is Threefold, the one is External, the other Internal, and the Third partakes of both: The two first are common to *Wine* and *Blood*, the last is common to *Blood* and *Milk*; when, as the Chymists say, they precipitate, that is to say, when the Parts separate. When this Separation happens to the *Blood*, and that the more subtile Part grows thick and coagulates, as in the *Pleurisy* and *Venereal Disease*, there will arise strange Accidents, and amongst them a very dangerous Fever.

The

The End of the Nutrition is to maintain and preſerve Life, and to be ſerviceable for the Growth and Increaſe of the Parts; for the *Blood* being a Fluid that moves without ceaſing, it diſſipates every Moment ſome Part or other, and it is neceſſary it ſhould recruit again to repair and reſtore the loſt Particles. There are two Sorts of Nutrition maintain'd: The firſt is made preſently, when the Parts have not acquired their Covering or Cloathing; and the other happens, when all the Parts have attain'd to their juſt Size and Proportion. When we are Infants, all our Parts are ſoft and tender, and ſeem to be nothing elſe but a Bundle of Pipes and Bladders that are extended to receive the Nutrition, which not only ſtretches and blows up or ſwells their Pores, as Air or Water fill a Sponge, but likewiſe by metamorphoſing it ſelf into the Subſtance of the Parts by the Diſpoſitions it makes in ſuch and ſuch a Manner; and when all the Parts of the Body are arrived to a certain Bulk, the nutritious Juice which water'd them, cannot make any further Progreſs by changeing it ſelf into their Subſtance, but maintains them in the ſame State of Bigneſs in filling all their Cells or Cavities, as Water does thoſe of a Sponge. This is what may be call'd a Baſtard or Spurious Nutrition to diſtinguiſh it from the other.

It is not the red Part of the *Blood* which ſerves for the Nouriſhment of the Parts; but, according to *Salve*, it is that ſweet and glutinous *Serum* that thickens when put upon the Fire. This nutritious Juice is not a heterogeneous Liquor, that contains in it ſeveral Particles of different Size and Figure, and thoſe proper for the Compoſition of Bones, Muſcles and Membranes; but this nutritious Jelly is a homogeneous Liquor, which moulds or forms it ſelf according to the Order and Diſpoſition required in the Parts: And it is not difficult to conceive, how a Liquor, as this Jelly, may ſupply the Parts that are ſo different in Structure and Uſe, ſince it is capable of being converted into what Figure or Subſtance ſoever is required, as we may ſee likewiſe in Rain, which is nothing but Water, yet nouriſhes all Sorts of Plants, Roots, Leaves, Fruits and Flowers. This Water, which is taſtleſs, is bitter in Wormwood, acrid in Muſtard, ſweet in Liquorice, ſolid in the Wood, and pliant in the Leaf and Flower: In ſhort, it is aſtringent and purgative in Rhubarb, and in other Plants has different Vertues. And would any one believe that all theſe various Parts were contain'd in Water? No, they would think it impoſſible, and rather be perſwaded, that all the Vertues of Plants, and all the Diverſity of their Parts, proceeded from the different Modifications of the Sap.

The efficient Cauſe of Nutrition depends on the Spirits; for we may ſee that the Parts grow lean when there are Obſtructions that hinder their Paſſage, becauſe the Veſicles not being ſufficiently extended, there is not Paſſage for the Spirits thro' the narrow Ducts they uſe to perviate, the Truth of which we may ſee every Day in Paralitick Parts, that are lean and cold, becauſe the Obſtructions hinder the Courſe of the Spirits.

The *Lympha*, according to *Etmuller*, is a Liquor naturally watry, ſubtile, ſpirituous, and a little acid, abounding with a moderate Acridneſs. The Matter which compoſes it, is nothing but the *Serum* ting'd with the nutritious Juice of the ſpermatick or nervous Parts, which it collects in the *Glands*, and is brought from thence into the *Blood* by the Lymphatick Veſſels. This *Serum* receives in the conglobate Glands a ſubtile, volatile, acid Liquor, or a ſaline Acid, which the *Arterial Blood* leaves there.

The *Lympha* is carried to certain Cavities of the Body for ſome particular Services, or to the Maſs of Blood near the right *Axillary Vein* for general Uſe. We know not yet what the Uſe of the *Lympha* is, that it mixes it ſelf with the *Blood* in the *Axillary Vein*, as it throws it ſelf into the *Blood* near the *Heart*, which conveys it to all the Body, and that it enters preſently into the right *Ventricle*, then into the Lungs and the left *Ventricle*. Some preſume from hence, that it ſerves to repair the vital Vigour of the *Blood*: Others ſay, that it is to dilute the *Blood*, to make it more fluid, apter to ferment, and not ſo eaſy or ready to congulate, becauſe that that which deſcends from the Head is depriv'd of Spirits, and that which aſcends from the lower Parts has a great deal of *Serum* in it.

Some

Some Moderns assure us, as we have said before, that the *Lympha* nourishes the Parts, and they conjecture that it is perform'd thus: They say, that all the round or globular Parts of the *Blood* that are in a very rapid Motion, unite to all those that are glutinous in it; this gluey Part melts or dissolves by rubbing against them all the Balls or globular Parts, by which Means they become more liquid, and in a better Condition for penetrating the vesicular Texture of the Parts, where they are again driven forward *de novo* by the Motion of the Balls, which press *a tergo* or behind, and which are of Use to make them enter further.

They add, that the *Lympha* moves as the *Blood*, from the *Heart* to the Extremities, and from thence to the *Heart* again; that first it is the *Blood* that spreads by the *Arteries*, and that afterwards it returns by the *Veins* and the *Lymphaticks*, which are small transparent Ducts, and so fine or thin, that if you touch them roughly with your Finger, they presently break and disappear, because the *Lympha* all runs out. They will have it besides, that these Ducts have two Membranes, by which the *Lympha* is carried from the Center to the Circumference of the Body; but they cannot yet discover these two Membranes, nor the Space they leave betwixt them to permit or allow the *Lympha* to flow from the Center to the Extremities. The *Lympha* does not flow to the Extremities at all, but on the contrary it comes from thence, as we may be satisfied by the Ligature and Injections. In short, they say, that its Use is entirely necessary in the Animal, that this is what supplies us with *Saliva*, the Stomach with a Dissolvent, and that it is this that makes the *Chyle* more fluid and fit for Motion; and in a Word, that it makes up the greatest Part of the *Blood*; for if we take away the *Lympha*, the Mass of *Blood* is reduced to a very small Thing: That it nourishes the Parts, and revives by its gelatinous Fat, and that after several Circulations, it leaves the sulphureous and saline Particles in the *Blood*, and jellies in the little Pores of the Vesicles of the Parts, that afterwards it it becomes clear and transparent as before, without having lost any Thing of its dissolving Virtue, so that it is in a Condition of dissolving of fresh Aliment.

The Separation of the *Lympha*, or its Infusion from the Glands in the Parts, is vitiated in its Production, when it is too copious, or too acid, or too salt, which sometimes creates *Catarrhs*; or rather, it is vitiated in its Course by the Lymphatick Vessels, whether in a natural State, or contrary to Nature, and this second Depravation of the *Lympha* creates *Dropsies*. The *Lympha* that flows continually from the *Trachea* to moisten it, and make it fit to form the Voice, from the Source of the Glands which are near the Chink of the *Larynx*, and if this *Lympha* is too plentiful, or too thick, the Voice becomes harsh and rough, if in a Catarrhous Indisposition it is too acid, being carried from the interious Tunicle of the *Trachea Artery*, it is impossible but it must be irritated, and cause an obstinate Cough.

Of

Of Chylification, *and its Paſſage into the* Blood; *with ſome Account of its Motion, together with Nutrition and Accretion. From* Phil. Verheyen, M. D. *Profeſſor of* Anatomy *in the Univerſity of* Louvain.

CHylification, which the *Greeks* call *Chyloſis*, is the Converſion of Meat and Drink into *Chyle*; for the Meat being taken into the Mouth, and chew'd there, if not fluid enough, is convey'd thence by Means of the Gullet into the Stomach, where mixing with other Liquids which are uſually taken down in eating, it is converted into a Kind of Pulp like Cream, which is called *Chyle*; but by what Vertue or Power the ſaid Meat or Food is digeſted into ſuch a Subſtance, is not yet ſufficiently prov'd by Reaſon or Experience. The Ancients chiefly affirm'd, it was perform'd meerly by natural Heat, after the ſame Manner as Victuals were reduced over the Fire to a ſofter Subſtance: But the Moderns reflecting upon this, will not allow, that hard Meat can be boil'd by any Degree of Fire in artificial Veſſels ſo exactly as in the Stomach; and affirm, that there is no ſuch Thing as Diſſolution of Meat by natural Heat alone, ſince that Heat does not appear to act otherwiſe than ſuch as we procure by Art; and ſince nothing is diſcover'd that ſo equally diſſolves the hardeſt Bodies as acid Chymical Liquors, they are of Opinion, that there is ſome Liquor prepared in the Body that is analogous to that of the Chymiſts, though much milder, which being beſtow'd upon the Stomach, and aſſiſted or join'd with the natural Heat, ſeparates and cuts aſunder the ſeveral Particles of the Aliment by its Acuity or ſharper Points And they alledge, that this Opinion is further confirm'd from the taking of Acids in at the Mouth, by which Means the Appetite is promoted, and the Diſſolution of the Victuals in the Stomach, which happens directly contrary upon the Exhibition of Crabs Eyes, Coral, Chalk, and the like, which either take away the Appetite, or at leaſt conſiderably abate it.

This Opinion, though it ſeems to have received its Sanction from the Teſtimony of many eminent Phyſicians and Philoſophers at this Day, yet is not without its Difficulties; for tho' Acids do create an Appetite, ſo Muſtard, Pepper, Ginger, and other Aromaticks, that are quite oppoſite to Acids, make a compleat Digeſtion, or render the Diſſolution of the Food more perfect. Beſides, Want of Appetite, and a Loſs of Chylification, oft proceeds from too much Acidity in the Stomach; for *Riverius*, in his Obſervations, relates a Story of one who for a long Time laboured under an acid Ructation, and having no Deſire to eat, was reduced to a *Skeleton*, yet afterwards reſtored to his former Health by taking five or ſix Grains of Pepper whole for ſome Days together upon an empty Stomach, by which Means the Ructation or Belching, together with the Sharpneſs, was remov'd, and the Appetite and Digeſtion reſtored. In the laſt Place, Acids are obſerv'd to curdle the Blood, Milk, and ſeveral other Things; now the Coagulation of Bodies is directly oppoſite to their Diſſolution.

Therefore weighing theſe Arguments together, I thought it the ſafeſt to ſtick to Experience as the beſt Inſtructor, deſiring from thence to learn, whether any Liquors digeſted according to Art with Food, would produce in them any Likeneſs of Chylification: Therefore I took Bread and Butter, with ſome Apple chew'd together, putting

Some Moderns assure us, as we have said before, that the *Lympha* nourishes the Parts, and they conjecture that it is perform'd thus: They say, that all the round or globular Parts of the *Blood* that are in a very rapid Motion, unite to all those that are glutinous in it; this gluey Part melts or dissolves by rubbing against them all the Balls or globular Parts, by which Means they become more liquid, and in a better Condition for penetrating the vesicular Texture of the Parts, where they are again driven forward *de novo* by the Motion of the Balls, which press *a tergo* or behind, and which are of Use to make them enter further.

They add, that the *Lympha* moves as the *Blood*, from the *Heart* to the Extremities, and from thence to the *Heart* again; that first it is the *Blood* that spreads by the *Arteries*, and that afterwards it returns by the *Veins* and the *Lymphaticks*, which are small transparent Ducts, and so fine or thin, that if you touch them roughly with your Finger, they presently break and disappear, because the *Lympha* all runs out. They will have it besides, that these Ducts have two Membranes, by which the *Lympha* is carried from the Center to the Circumference of the Body; but they cannot yet discover these two Membranes, nor the Space they leave betwixt them to permit or allow the *Lympha* to flow from the Center to the Extremities. The *Lympha* does not flow to the Extremities at all, but on the contrary it comes from thence, as we may be satisfied by the Ligature and Injections. In short, they say, that its Use is entirely necessary in the Animal, that this is what supplies us with *Saliva*, the Stomach with a Dissolvent, and that it is this that makes the *Chyle* more fluid and fit for Motion; and in a Word, that it makes up the greatest Part of the *Blood*; for if we take away the *Lympha*, the Mass of *Blood* is reduced to a very small Thing: That it nourishes the Parts, and revives by its gelatinous Fat, and that after several Circulations, it leaves the sulphureous and saline Particles in the *Blood*, and jellies in the little Pores of the Vesicles of the Parts, that afterwards it becomes clear and transparent as before without having lost any Thing of its dissolving Virtue, so that it is in a Condition of dissolving of fresh Aliment.

The Separation of the *Lympha*, or its Infusion from the Glands in the Parts, is vitiated in its Production, when it is too copious, or too acid, or too salt, which sometimes creates *Catarrhs*; or rather, it is vitiated in its Course by the Lymphatick Vessels, whether in a natural State, or contrary to Nature, and this second Depravation of the *Lympha* creates *Dropsies*. The *Lympha* that flows continually from the *Trachea* to moisten it, and make it fit to form the Voice from the Source of the Glands which are near the Chink of the *Larynx*, and if this *Lympha* is too plentiful, or too thick, the Voice becomes harsh and rough, if in a Catarrhous Indisposition it is too acid, being carried from the interious Tunicle of the *Trachea Artery*, it is impossible but it must be irritated, and cause an obstinate Cough.

Chylification, *and its Paſſage into the* Blood; *with ſome Account of its Motion, together with Nutrition and Accretion. From* Phil. Verheyen, M. D. *Profeſſor of* Anatomy *in the Univerſity of* Louvain.

Chylification, which the *Greeks* call *Chyloſis*, is the Converſion of Meat and Drink into *Chyle*; for the Meat being ken into the Mouth, and chew'd there, if t fluid enough, is convey'd thence by eans of the Gullet into the Stomach, where ixing with other Liquids which are uſual- taken down in eating, it is converted in- a Kind of Pulp like Cream, which is cal- *Chyle*; but by what Vertue or Power the d Meat or Food is digeſted into ſuch a bſtance, is not yet ſufficiently prov'd by aſon or Experience. The Ancients chiefly irm'd, it was perform'd meerly by natural eat, after the ſame Manner as Victuals ere reduced over the Fire to a ſofter Sub- nce: But the Moderns reflecting upon is, will not allow, that hard Meat can be il'd by any Degree of Fire in artificial eſſels ſo exactly as in the Stomach; and af- m, that there is no ſuch Thing as Diſſolu- on of Meat by natural Heat alone, ſince at Heat does not appear to act otherwiſe an ſuch as we procure by Art; and ſince othing is diſcover'd that ſo equally diſ- lves the hardeſt Bodies as acid Chymical iquors, they are of Opinion, that there is me Liquor prepared in the Body that is nalogous to that of the Chymiſts, though uch milder, which being beſtow'd upon e Stomach, and aſſiſted or join'd with the atural Heat, ſeparates and cuts aſunder the veral Particles of the Aliment by its Acuity r ſharper Points And they alledge, that is Opinion is further confirm'd from the king of Acids in at the Mouth, by which eans the Appetite is promoted, and the iſſolution of the Victuals in the Stomach, which happens directly contrary upon the Exhibition of Crabs Eyes, Coral, Chalk, and the like, which either take away the Appetite, or at leaſt conſiderably abate it.

This Opinion, though it ſeems to have received its Sanction from the Teſtimony of many eminent Phyſicians and Philoſophers at this Day, yet is not without its Difficulties; for tho' Acids do create an Appetite, ſo Muſtard, Pepper, Ginger, and other Aromaticks, that are quite oppoſite to Acids, make a compleat Digeſtion, or render the Diſſolution of the Food more perfect. Beſides, Want of Appetite, and a Loſs of Chylification, oft proceeds from too much Acidity in the Stomach; for *Riverius*, in his Obſervations, relates a Story of one who for a long Time laboured under an acid Ructation, and having no Deſire to eat, was reduced to a *Skeleton*, yet afterwards reſtored to his former Health by taking five or ſix Grains of Pepper whole for ſome Days together upon an empty Stomach, by which Means the Ructation or Belching, together with the Sharpneſs, was remov'd, and the Appetite and Digeſtion reſtored. In the laſt Place, Acids are obſerv'd to curdle the Blood, Milk, and ſeveral other Things; now the Coagulation of Bodies is directly oppoſite to their Diſſolution.

Therefore weighing theſe Arguments together, I thought it the ſafeſt to ſtick to Experience as the beſt Inſtructor, deſiring from thence to learn, whether any Liquors digeſted according to Art with Food, would produce in them any Likeneſs of Chylification: Therefore I took Bread and Butter, with ſome Apple chew'd together, putting

to it a little Quantity of Beer, according to the Method of Feeding in this Country, which Compoſition or Mixture I thought very fit for Digeſtion. I put different Parts of this Mixture in ſeveral different Bladders, into one of which I poured Spirit of Vitriol, into another Spirit of Salt, into a third Nitre, and into the reſt different Liquids, and one I left pure and unmix'd, without any other Liquor. Theſe little Bladders being tied differently for Diſtinction Sake, I put into warm Water, and continued them about eight Hours in the ſame Degree of Heat, which I imagined might be equal in ſome Meaſure to that of the Stomach; but when I had finiſh'd the Operation, I ſcarce met with any other Reward for my Pains, only that I found, the Method Nature took in the Diſſolution of Food was not to be diſcover'd this Way; for whereas the Food in a healthful Conſtitution was perfectly reduced to *Chyle* in much leſs Time, here it was ſcarce remarkably chang'd, yet more ſo in thoſe Bladders wherein I had put the acid Liquor, but not ſufficiently enough to conclude any Thing for the Acid being the Inſtrument of Chylification.

Neither could I from the Succeſs of this laſt Experiment infer any Thing againſt the Doctrine of the Moderns, becauſe, as in Chymical Operations, it is not every Acid that will diſſolve every Body capable of Diſſolution by *Acids*; like as we ſee in *Aqua Regia*, that diſſolves Gold, which common *Aqua fortis*, though abundantly more corroſive, will ſcarce touch: Therefore we ſay, in our Bodies it is not every *Acid* that is appropriated for Chylification, but ſomething that is ſpecifical, and appointed by Nature for that End or Purpoſe; for I have obſerv'd in Practice, that Salt of Steel, though in its own Kind a gentle Acid, or rather a ſweet Acid, much more promotes or increaſes the Appetite than Spirit of *Vitriol*, or other Simples, that much ſurpaſs it in Acidity, from whence perhaps it comes, that Muſtard, Pepper, Spirits of Wine, and the like, are more agreeable to the Stomach.

Beſides all theſe Things, that there is a certain digeſtive Humour, the Glands of the Stomach prove, which are undoubtedly like other Glands, for the Tranſcolation or Straining of ſome Humour, and it does not appear for what End they were tranſmitted to the Stomach, but to facilitate Digeſtion. But leſt any Body ſhould think that there is any Thing ſeparated by theſe Glands from the Stomach into the *Gaſtrick Veins*, we are to conſider, that the *Glands* are uſeleſs for Sequeſtration of any Thing from any great Cavity, and that Nature is obſerv'd to do nothing like it in other Places; ſince wherever Matter is ſeparated, it is brought by ſmall Veſſels, and the very Fabrick of the Glands is conſtituted of Veſſels, and the Diſpoſition of them appears from the Texture of the *Glands*. This digeſtive Humour therefore, or at leaſt its immediate Matter, is brought to the Stomach by the *Gaſtrick Arteries*, according to the Method of the Blood's Circulation, and by Mediation of the Stomach Glands, into the Cavity of the Stomach. I ſay, its immediate Matter is brought here at leaſt, becauſe as of ſome others, ſo likewiſe we may doubt of this Humour, whether or no it formally exiſts in the Maſs of *Blood*, or rather is generated in the very Sequeſtration, or immediately after it, from the various Particles that are required to make up the Texture of the ſaid Humour. In the mean time it is certain, that it is either generated in the Maſs of *Blood*, or at leaſt that its Matter is adapted or diſpoſed for the Diſſolution of the Food.

Neither does this alone, but the *Saliva* or *Spittle* is not without Reaſon thought to concur towards *Chylification*, as the Victuals held ſome Time in the Mouth gains a greater Degree of Whiteneſs, which is at leaſt a Token of an imperfect Chylification, or that it is begun. Moreover, thoſe whoſe Mouths are dry, though they are moiſten'd with any foreign Liquid, yet they do not perceive, or are ſenſible of, the uſual Taſte of their Victuals; which is an Argument, that the Particles are not ſo divided as by the *Saliva*, and therefore do not affect the Guſtatory Nerves ſo ſenſibly. In the laſt Place, the *Saliva* has a Power, or rather Diſpoſition, to ferment and incide, and conſequently to digeſt and attenuate, and will appear from the Experiments made on that Fluid, which we ſhall treat of hereafter.

Beſides this, we ſwallow our Spittle frequently in a Day by it ſelf, and it is continually mix'd with the Food which we chew, and

ſtill more plentifully and intimately the
er we roll the Victuals in our Mouth,
grind it in our Teeth. Since therefore
harder and tougher Meat is divided by
greater Maſtication and Diſſolution in
Stomach, hence it is provided by Nature,
in the firſt Action it ſhould be more
er'd with the *Saliva*, and ſo the better
diſpoſed for the ſecond. Neither does it
ear to me from the Diſſolution of the
at, that the remaining *Chyle* is to be ejected
n the Things that were taken in before,
remain'd amongſt the Folds and Wrin-
s of the Stomach, becauſe in ſome the
ve Particles are join'd together, and act
their own Accord. We ought likewiſe
have particular Regard to the Share the
its have in this Work, being brought to
Stomach by the Nerves of the *Par Va-*
z, and afford great Aſſiſtance to the Ela-
ation of the *Chyle*, ſo that they do not
y conſtringe the Stomach on every Side,
expreſs the digeſtive Humour, but like-
e pour it out from the moving Fibres in-
its Cavity, ſtirring up from thence other
ſtruments for making of *Chyle*, and drive
ward the Matter appointed for that End.
Moreover, it is very likely that the Ali-
nt in the Stomach being ſomething broke,
s as it were ground by its Sides in the pe-
altick Motion and Agitation of the Parts
acent. Neither is it of great Moment
ether the Impulſion be very ſtrong, or
Sides of the Stomach hard and cutting,
ce the Body that is to be broke or rub'd
Pieces is not ſo very firm and ſolid; and
auſe the *Food* remains ſome Time in the
mach, the Sides thereof are frequently
ven againſt it; ſo that we may reaſona-
imagine, that the ſoft Aliment is dimi-
hed either previouſly by Maſtication, or
e artificial Preparation, or elſe in Courſe
Time further leſſen'd by the ſaid Impulſe,
which we muſt allow natural Heat ſome
dition of Air, of which hereafter; and
all theſe are not ſufficient for the making
Chyle without the Concourſe or Mixture
a digeſtive Humour, as appears from the
owing Obſervation:

One Day when I had dined heartily, but
ck, at Noon, I took nothing in the
ning but a Draught of Small Beer, which
s ſufficient to dilute the remaining *Chyle*
upon the Stomach, and carry it down into the Guts. I was alſo very cautious next Morning of ſwallowing my Spittle, and yet I was ſooner and more hungry than at other Times when I uſed to eat a moderate Supper. But this Hunger could not be excited by the Remainder of the *Chyle*, that being undoubtedly carried off the Stomach with the Small Beer; neither by the *Saliva*, which was very ſmall, if any at all came to the Stomach: But the Spirits were too thin and ſubtile, ſo that they irritated the Membrane of the Stomach, as is required for exciting of Hunger; neither is the periſtaltick Motion or Preſſure of the Ventricle capable of effecting this, becauſe it is not leſs, but rather greater, upon a full Stomach than an empty one; therefore this can never be the Reaſon of Hunger. If Deſire was raiſed by ſuch a Kind of Motion, there is likewiſe the ſame Reaſon concerning the natural Heat, and the airy Matter, except there is ſomething iſſued forth of a digeſtive Humour; therefore there ought to be that which vellicates the Membranes of the Stomach, by which Hunger is excited, and which ought to be ſomething different from the aforeſaid, and indeed more active. It ought (I ſay) to conſiſt of acute or pungent Particles, that are proper or fit to prick upon the nervous Coat or Membrane of the empty Stomach, and upon its being full, to inſinuate it ſelf into the Contents thereof to diſſolve them; which cannot any other Ways be deduced, than from the Maſs of *Blood* by the Glands of the Stomach, as I have ſaid before of the particular digeſtive Humour.

But ſince Bones are ſo readily diſſolv'd in a Dog's Stomach without any previous Maſtication, as we may obſerve; and ſince we ſee theſe Things likewiſe diſſolv'd out of the Body by Acids, eſpecially if Heat be added to their Aſſiſtance; hence we may ſuppoſe, that the digeſtive Humour in a Dog's Stomach is more acid than that in a Man's, in which ſuch Bones are not ſo eaſily diſſolv'd. Therefore from what has been ſaid, and what we may be able to collect from Reaſon, Chylification ſeems to be perform'd after this Manner: The Meat being duly chew'd and impregnated with *Saliva*, the digeſtive Humour is mix'd with it in the Stomach, and the remaining *Chyle*, if any left,

which uniting together, and excited by the natural, begin gently to ferment, from whence the active Principles being more exalted, ſink the thinner Maſs the deeper, which, when they endeavour to deſcribe their Motion by a right Line, throw the impeding Parts of the Food on every Side, and ſeparate and divide many Ways. In the mean time, while theſe Things are done within, the Spirits alſo, by the Motion of what is contained in the Stomach, are plentifully diſtributed into the moving Fibres, and ſtrongly force the rough or nervous Coat thereof upon the Aliment, by that Means grinding and breaking the Parts thereof; but freſh Spirits ſucceeding theſe, continually drive on the former, which, that they may make Way for them, ruſh into the Cavity of the Ventricle, where they mix with its Contents, and are neceſſary towards procuring a vigorous and active Chylification; but the Particles of the Food being thus diſſolv'd and ſubtiliz'd, mix the better with the potable Matter, and therewith form a certain pulpy Compoſition, which we call *Chyle*.

But if there was no Liquid taken in, the Solid would be difficult to be fermented, and the Inſtruments of Digeſtion would be leſs able to penetrate; and therefore Chylification could not ſucceed ſo happily, unleſs ſome ſmall Matter of Liquid was receiv'd, or that the Stomach was very moiſt: Likewiſe the *Chyle* made from hence is hardly, or with Difficulty, diſtributed. On the other Hand, if there be an Exceſs of Liquid taken, the digeſtive Humour mixing with it, loſes its Force, and can ſcarce digeſt the Food, but paſſes too quick or precipitately out of the Stomach with the Liquids. The Remainder of the Chyle is not abſolutely neceſſary for Digeſtion, from whence we may conclude, that it ſucceeds after a long Abſtinence or Faſting.

Thoſe who are uſed to eat nice and delicate Meat, that is eaſy of Digeſtion, hardly digeſt the ſtronger; and thoſe uſed to ſtronger Food, the Sides of whoſe Stomachs are firmer, produce a digeſtive Humour and *Saliva* of greater Activity. Thoſe who labour hard, or exerciſe the Body well, have a good Digeſtion, the Reaſon of which is plain, becauſe by Motion and Agitation the digeſtive Humour that exiſts in the Stomach, as it is poured more upon the Aliment, ſo a freſh Supply is eaſily and more plentifully generated from the Maſs of *Blood*, and brought to the Stomach. Hence ariſes a Difficulty, namely, why Digeſtion is leſſen'd or weaken'd in hot Weather, ſince, according to the Modern Philoſophers, Heat conſiſts in a quick Motion of Bodies: On the contrary, when the Air is cold, and conſequently motionleſs, the Digeſtion is ſtronger. The Reaſon of this *Phænomenon* is generally ſolv'd thus: *viz.* That the digeſtive Humour, by reaſon of the great Heat, is too much attenuated or thin'd; and further, that it is evaporated by the great Opening of the Pores of the Skin; and though by the Exerciſe of the Body the Blood is greatly heated, yet there does not happen ſuch an Apertion of the Pores, except ſometimes from violent Exerciſe, from whence Digeſtion is not aſſiſted. For the very ſame Reaſon they aſſert, that cold Baths increaſe both Appetite and Digeſtion; but the hot Baths on the other Hand leſſen them, as thoſe who uſe them can teſtify.

This Solution, as it is not altogether unacceptable, ſo it is not ſo ſatisfactory as I could wiſh; for tho' in Winter-time with great Exerciſe there is much Sweat, and a great Diſſipation or Loſs of Matter, yet the Appetite and Digeſtion is promoted; and it is not eaſily to be believed, that in ſuch a Caſe the digeſtive Humour ſhould not be conſiderably diſſipated, ſince we ſuppoſe from the ſame Reaſon, that in Summer-time the Digeſtion languiſhes: Therefore it ſeems to be a Diſparity of Reaſon betwixt the Summer Heat and that rais'd by Exerciſe; from whence I ſuſpect, that in Chylification there is a certain Matter concurs which is taken from the Air in the Uſe of Reſpiration, which is more plentiful, and endow'd with greater Activity in Winter than in Summer-time, in watry or low Places than in mountainous ones, and which will be better underſtood when we come to ſpeak of the Benefit and Uſe of Reſpiration.

Of the Expulsion of the Chyle *from the* Stomach, *and its Passage to the* Blood. *By the same Author.*

THE *Chyle* made in the *Ventricle* is brought by its right Orifice or the *Pylorus* to the *Duodenum*, and that as well by the *peristaltick* Motion of the Stomach, as the Squeezing of the adjacent Parts, and especially of the *Diaphragm* at every Inspiration by the Resistance of the Sides of the *Abdomen*; but the *Chyle* rather gives Way or yields towards the Intestines than the *Oesophagus*, because not only its Passage is easier towards the *Pylorus*, but also the peristaltick Motion begins at the left Orifice, and is continued towards the right. From hence the Squeezing is greater in the left Side, where the Stomach is more extended, and therefore by that its Contents make Way to the right. Neither shall we say, that the right Orifice of the Stomach is press'd by the Liver lying upon it, because that Bowel is tied by proper Ligaments on the upper Part to the mucronated Cartilage, on the lower Part to the Navel-string, and at the Time of Inspiration draws more upwards, than downwards and forwards. Hence, at the same Time that the Capacity or Hollow of the Stomach is most squeez'd by the neighbouring Parts, the *Spleen* is from the said Ligaments made tenser, and lies less on the right Part of the Stomach.

The *Chyle* being driven into the Gut *Duodenum*, is water'd afresh with new Liquids, to wit, the *Gall*, and *Pancreatick Juice*, with which the *Chyle* is still render'd more fluid, and therefore apter to continue on its Motion; the Vessels lubricated, and therefore afford an easier Passage; and what I reckon the chief Thing, the purer Part of the *Chyle* by Way of Precipitation is separated from the more fæculent, that from thence the Orifices of the Lacteal Veins might the readier admit it. But we shall say more of this Fluid in its proper Place. The *Chyle*, with the like Power with which it was expuls'd from the *Ventricle*, to wit, by the peristaltick Motion and Squeezing of the Parts, is convey'd further by the Intestinal Duct, and in its Passage by Degrees or little and little deposites the purer Part into the *Lacteals*, to which the *Valvulæ Conniventes* or the Foldings of the Guts are much contributing, and crooked Situation and Inequality or Unevenness of them, by which Means the *Chyle* cannot so readily continue its Passage towards the *Anus*. This peristaltick Motion likewise not only contributes to the Translation of the Matter, but also seems to conduce much towards the opening of the Orifices of the *Lacteals*, since there are constrictory Fibres so knit to their Sides, that being contracted by them, they mutually open to one another; for unless we suppose the Matter so, I can see no Reason why *Wind*, that is thrust into the Guts, should not break through the Orifices of the *Lacteals*.

The grosser and more excrementitious Part of the *Chyle*, which is denied Entrance into the said Orifices by the Constriction of the said Fibres, and otherwise, forces its Motion, notwithstanding the Difficulty of its Passage, towards the *Anus* for Exclusion. But lest Necessity should compel Men too frequently to exonerate, several of the Guts are very large, in which the *Faces* are collected, till they grow in too great Quantities, or being burthensome, are ejected, ordinarily by the Force of Inspiration, Vomiting, the peristaltick Motion, and Pressure of the Parts: But the purer and ballamick Part taken into the *Lacteals*, is by Degrees convey'd from the minutest Branches to the larger, and at length by Ducts into the great Receptacle of the *Chyle*, call'd *The Cistern*, from whence it passes by the *Thoracick Duct* to the *Subclavian Vein*, and thence with the *Blood*, to which mixing it self, it passes to the *Heart*, and from thence undergoes various

Motions,

Motions, Alterations and Changes, as we ſhall further ſhow in the Motion and Conformation of the *Blood*.

The Paſſage of this *Chyle* appears evidently in a live Dog, if the *Abdomen* be open'd an Hour or little more after the taking in of a good Quantity of Milk; for the Milk, becauſe fluid, paſſes eaſily from the Stomach, and by its Whiteneſs makes the ſtrait Paſſages thro' which it flows appear plain. 'Tis manifeſt, that at the Inſertion of the *Thoracick Duct* the *Chyle* in Dogs mixes with the *Blood*, firſt of all in the anterior *Crural Vein*, uſually the left. I have found the ſame Duct in an Ox implanted at the right *Crural*; but in Man, whoſe Figure is erect, they are not join'd to the anterior *Crurals*, but the *Subclavians*, which are united after the ſame Manner to the Trunk of the *Vena Cava*, as the anterior *Crurals* are join'd to the ſame Trunk in a Dog; ſo that there is no Doubt but that the *Thoracick Duct* in a Man is ingrafted into the *Subclavian Vein*, as ocular Demonſtration ſhows. But though this Duct is ſeen inſerted into the left *Subclavian*, though few have ſeen that, I dare not be ſo bold as to aſſert, that the ſame Duct terminates in the left *Subclavian*: And though the bittereſt Gall is pour'd into the *Chyle* as it permeates the *Duodenum*, yet it does not appear either in the *Lacteals*, or the *Ciſtern*, to be ting'd with Bitterneſs; for having often taken *Chyle* from the *Ciſtern* of a Dog, and taſted it, and given others that were Byſtanders to taſt, we none of us could diſcover any Senſe of Bitterneſs in it.

Of the Circulation *of the* Blood. *From the ſame Author.*

I Thought it neceſſary, before I came to ſpeak of the Motion of the *Blood*, to inquire into the Nature of *Chyle*, and the Method of *Sanguification*, which I have ſet forth in as ſuccinct and clear a Manner as I was capable of. The *Blood* then has two Motions, to wit, an Inteſtine Motion, and a Circular Motion; the firſt of which we ſhall reſerve till we come to treat of *Fermentation*, &c. and here confine our ſelves to that of *Circulation*. The Circular Motion or Circulation of the *Blood*, is that Motion which paſſes from the Trunk of the *Vena Cava*, and ſome other Branches, into the right Ventricle of the *Heart*, and from thence, by the Conſtriction of the *Heart*, into the *Pulmonary Artery*, by whoſe Branches diſpers'd through the Lungs, it is brought into the Branches of the *Pulmonary Vein*, and from thence by its Trunk into the left Ventricle of the *Heart*, from whence, by the Conſtriction of the *Heart*, it is driven into the *Aorta*, and by the Aſſiſtance of its Branches, diſtributed through the whole Body; and that which is neither beſtow'd upon the ſolid Parts, or any other Ways out of the Road of the Circulation, paſſes thro' from the Branches of the *Aorta* into thoſe of the *Veins*, and at laſt through the Trunk of the *Vena Cava* back again to the right *Ventricle* of the *Heart*, as before.

This Motion of the *Blood*, which we call *Circular*, becauſe it returns to the Place from whence it firſt ſet out, is prov'd after this Manner: Firſt of all, from the Conſtitution of the *Blood Veſſels*, which lie near to the great Trunk or Ventricles of the *Heart*, and by Degrees receding from the *Heart*, are divided into ſeveral Branches; for this Fact appears from no other Reaſon, than that the *Blood* is plentifully thrown in from what we call *Veins*, into the Cavity of the *Heart*, and from thence driven out again into thoſe called *Arteries*; obſerving, that the *Valves* before the Gates or Mouths of the *Veins*, admit the *Blood*'s Entrance into the *Ventricles* of the *Heart*, but ſtop its Return into the *Veins*; but the *Valves* in the *Arteries* have the quite contrary Uſe. Hence it is manifeſt, that the *Blood* moves by the *Pulmonary Artery* from the right *Ventricle*, and by the *Vein* to the left, in like Manner from the left *Ventricle* into

into the Trunk of the *Aorta*, and from thence into the Branches of it, till at laſt it come to the utmoſt Extremities. It is likewiſe apparent, that the ſame *Blood* paſſes into the *Vena Cava* from the ſtraighter Branches into the broader, and from thence to the Trunk, and therefore from the remote Parts to the right *Ventricle* of the *Heart*.

Thoſe fine or ſlender *Valves* that are in the *Veins* prove this Paſſage ſufficiently; for they are frequently found larger about the Inſertion of Branches, and are ſo ſituated, that they may perpetually impede or hinder the Return of the Blood to the Extremities, but never retard its Paſſage from the Extremities to the Cavities of the *Heart*. Since therefore the *Blood* is return'd by the *Veins* to the Cavities of the *Heart*, from whence it iſſues out, it follows neceſſarily, that it moves circularly, and theſe Valves are deſcrib'd in Vol. 2. of this Work, in the Deſcription of the *Veins* and *Arteries*. In the next Place, This Circuit of the *Blood* is prov'd from the Pulſe of the *Arteries*, whereby the *Blood* is manifeſtly propel'd in greater Quantity from the *Heart* into the *Arteries* than is required for Nutrition of the Parts, or can be recruited by the new Succeſſion of the *Chyle*; therefore it is neceſſary that it ſhould return to the *Heart*, and from thence circulate about the Body.

In the third Place, The Circulation of the *Blood* is plainly proved by the following Anatomical Experiment: In a live Dog the *Vein* and *Artery* being laid bare, which is moſt conveniently done in the poſterior *Crural* about the Flank or Groin, by tying the Parts with a Bandage; which being done, the Part of the *Artery* next the *Heart* will appear ſwell'd, but that below the Ligature, the furtheſt diſtant from the *Heart*, ſunk; but in the Vein it will be directly the contrary, the Vein ſwelling under the Ligature, and ſinking above it, or neareſt to the *Heart*. But if the ſwell'd *Artery* be open'd by a *Lancet*, the *Blood*, eſpecially if the Dog be lively, will break out impetuouſly, and ſpring ſeveral Foot high, and if the *Artery* remain open any Time, the *Blood*, together with the Life of the Dog, will ſoon have finiſh'd its Courſe. But if an Apertion be made below the Ligature, nothing, or at leaſt a very inſignificant Matter, will flow thence; but if you ſtrike the *Vein* in the ſame Place, there will be a plentiful Effuſion, but not with ſuch Force as from the *Arteries*. Hence it is evident, that the *Blood* that iſſued out from the Cavity of the *Heart* by the *Arteries*, returns to the ſame Place by the *Veins*, and conſequently moves circularly.

Every Part of the *Blood* does not always deſcribe an equal Circle, but ſometimes a ſhorter, and ſometimes a longer, conformable to the Situation of the Parts, and the Length of the Veſſels. Hence that *Blood* makes the longeſt Circle that moves by the Extremities of the Limbs, to wit, by the Toes and Fingers, and that the ſhorteſt that paſſes through the Subſtance of the *Heart*, the Auricles, and other Parts about the *Heart*. Neither does all the *Blood* run thro' many Veſſels in every Round, for the greateſt Part of it performs its Courſe thro' each *Ventricle* of the *Heart*, by the *Pulmonary Vein* and *Artery*, thro' the *Aorta* and *Vena Cava*; but that Part which reaches the Brain, beſides the ſaid Veſſels, permeates alſo the *Sinus* of the *Duræ Meninges*, and its Branches; and that which circulates through the *Stomach*, the *Spleen*, *Pancreas*, *&c.* paſſes from the Branches of the great *Artery* into thoſe of the *Vena Porta*, and from thence, by the Mediation of its Trunk, and thoſe Springs which creep through the *Liver*, into the Branches of the *Vena Cava*, as the Compoſition of the ſaid Veſſels ſufficiently demonſtrate.

In the Definition of the *Circulation* of the *Blood*, I have not affirm'd poſitively that this paſſes from the *Vena Cava* into the right *Auricle* of the *Heart*, or from the *Pulmonary Vein* into the left *Auricle*, as all the Moderns have hitherto done, thinking, that all the *Blood* enter'd this or that *Auricle* before it came at the correſpondent *Vein*; but this is erroneous, becauſe there is no Appearance that all the *Blood* comes to the *Ventricles* of the *Heart* directly from its *Auricles*, but its greateſt Portion enters them immediately from the *Veins*, which is proved thus:

Firſt of all, The Way is much directer from the *Vena Cava* to the Cavity of the *Heart*, than to its *Auricle*, which the *Blood* cannot enter without receding from its ſtrait Paſſage, as *Autopſy* will demonſtrate from the Inſertion of both the upper and lower Trunk

of

of the *Vena Cava* directly into the right *Ventricle* of the *Heart*, ſo that the *Blood* cannot fill the *Auricle* without riſing upwards, which is more difficult for it, conſidering the Stream with which it is brought into the Heart, ſo that the *Auricle* is not fill'd with the *Blood* till the *Ventricle* is replete or contracted. In the next Place, It is impoſſible at that Time when the *Blood* flows from the *Auricles* into the *Ventricles*, to enter the ſame *Auricles* another Way, becauſe the firſt *Blood* hinders the Paſſage of the latter, and ſo *Vice verſa:* Therefore the *Blood* which comes by the *Veins* at the ſame Time, enters directly into the *Ventricles* of the *Heart*; for this Entrance is not ſtop'd by the Motion of the *Blood* coming out of the *Auricles*, ſince, as I have ſaid, theſe are laterally oppoſite.

But when the *Ventricles* are full, or contracted, that they expel the *Blood* contain'd in them, there is not a free Entrance into the *Heart*, from whence the *Blood* at that Time, becauſe it comes without Intermiſſion by the Veins, is forced to turn aſide to the *Auricles*.

The Deſcription of *Circulation* uſually begins from the *Vena Cava*, becauſe from thence the freſh *Chyle* enters into the *Blood*, and firſt begins its Circulation therewith: Thence it has been rather thought to begin here than any other Part. In the mean time, I do not ſee it is of ſuch great Moment, but that we may aſſign the Beginning of Circulation from any other Place. The Circulation of the *Blood* may likewiſe be briefly deſcrib'd without making Mention of ſo many Paſſages, namely, the Motion of the *Blood* from one *Ventricle* of the *Heart* through the *Arteries* and *Veins* to the other, and from thence back again by other *Arteries* and *Veins* to the former. But 'tis certain, the Ways of Circulation ought to be known and well underſtood by the Phyſician.

In the firſt Deſcription of Circulation, which is more exact to that from the Trunk of the *Vena Cava*, I have added the *Coronary Vein*, and ſeveral of its Branches, which before I never mention'd, neither has it ever been done by any before. I ſay, I added, becauſe now it is ſufficiently evident, that not all the *Blood* that enters the right *Ventricle* of the *Heart* comes by the Trunk of the *Vena Cava*, either proximately, or by Mediation of the right *Auricle*, but that ſome Portion of it is brought by the Branches of the *Coronary Vein* of the *Heart*, the Mouths of which lie open into the ſaid *Ventricle*, as appears in the Anatomy of the *Heart*, Volume the Second, from *Verheyen*.

Amongſt the Ways or Paſſages of Circulation, the little Caverns of the Carnous Fibres are deſervedly to be enumerated; for by tying an *Artery* that leads to this or that Muſcle, its Operation or Action will from thence ceaſe, which is a Sign that the *Arterial Blood*, equally with the Animal Spirits, is requiſite towards the Contraction of the Muſcle. From hence, if you divide the Belly of a Muſcle according to the Duct of the Carnous Fibres, this not being much injur'd, nothing, or at leaſt a very little Matter of *Blood*, will flow from thence, but a great deal, if you cut them croſſways: Therefore it ſhows, the *Blood* flows plentifully thro' them, of which there is a great Need for their Nutrition, as well as Circulation; but thro' the Stomach, Guts, and other neighbouring Parts, there is obſerv'd to be a certain ſelect or choice Matter that flows thro' them, not much unlike the *Lympha*, which is neceſſary for their Contraction after the ſame Manner as *Blood* is for the *Carnous Fibres*.

The *Blood* runs ſwifter thro' the *Arteries* than thro' the *Veins*, becauſe the latter not abounding ſo with contracting Fibres, are not ſo capable of protruding the *Blood* thro' them, and this Motion being debilitated or weaken'd in the *Veins*, it is communicated to the Parts about it; but in the *Arteries*, except the *Pulmonary*, it is much more ſubtile and fluid, and conſequently apter for Motion: From whence alſo the *Veins* that anſwer to the *Arteries* are always wider, when they ſhould be juſt the contrary if the *Blood* flow'd thro' them with ſuch a rapid Courſe; for the *Veins*, except the *Pulmonary*, and in that Part of the *Cava* which is betwixt the right *Ventricle* of the *Heart* and the Inſertion of the *Thoracick Duct*, carry nothing conſiderable in them which they receive not from the *Arteries*, and yet from them a remarkable Part is carried into the Lymphaticks, another into the Nutriment of the ſolid Parts, another for *Milk*, *Gall*, *Urine*,

&c. and therefore it follows, a much Quantity of Humours is brought by *Arteries* than the *Veins*; but the larger or Room in the Veins, ſhows there is ater Quantity of *Blood*, which, ſince it t to be drawn from the *Arteries*, it can- have, unleſs becauſe the *Blood* remains er in the Veins, and therefore proceeds a ſlower Motion.

he *Blood* likewiſe flows ſwifter thro' the rnal Parts, becauſe in the external Parts reedom of Paſſage is frequently hinder'd he Compreſſion of Bodies, with which c Parts are ſtop'd, and that alſo not ſel- by the circumambient Air, which con- es the *Blood*, and ſo renders it leſs fit for ion. It happens, that the leſſer Veſſels the Habit of the Body are on all Sides ributed, and many Ways recede from a t Line, from whence the Paſſage of the d is likewiſe made difficulter: And laſt- as far as ever I could obſerve, the ſmall eries contain more proportionably than larger from which they are derived.

The Inquiſitive *Leeuwenhoeck* has endea- r'd to prove, that the *Blood* does not flow fter thro' the great Veſſels than the leſs, ng made towards the End with a double be, and in ſome ſmall middle ones be- xt both, which conſtitute a continued ſt with the larger; and indeed he proves ll, that the Liquor emitted by one of the ater Tubes, is moved equally ſwift by other, and what relates to the leſs, except y all have the like Capacity, the Liquor l be as ſwiftly moved by the leſſer Tubes. is evidently appears in a *Funnel*, the up- Part of which, tho' it be an hundred es as large as the Pipe or lowermoſt Part, every where of the ſame Breadth, yet Liquor contain'd therein could not de- nd to a certain Space, as for Example, a ger's Breadth, except at the ſame Time ſo ch Liquor deſcended by the Part of the e, as amounted to the Finger's Breadth; hence this Liquor flows at the Pipe of Funnel an hundred times as ſwift as at broad Part. The ſame Thing is evident Rivers and Brooks, where the Water is ſerv'd to run ſwifter according to the aightneſs of its Banks.

But this Proof of *Leeuwenhoeck*'s is no- ng to the Purpoſe, where it is objected to him, that the *Blood* makes a ſlower Progreſs in the Extremities of the Body, and ſwifter in the Veſſels ſeated near the *Heart*; therefore not becauſe there the Veſſels are ſmall, and here larger, but for the Reaſons aforeſaid. Add to this the Diſparity betwixt the Motion of our *Blood* and the Liquor contained in theſe Tubes, whoſe Sides are ſtiff, as being made of Tin or Lead; but the Veſſels of the Body, as Occaſion ſerves, are dilated and conſtring'd. Alſo the *Blood* circulates ſwifter thro' the Heart than thro' ſeveral other Parts of the Body, to wit, where the Motion is retarded in the inferior Parts, as in the Hands, becauſe of the Aſcenſion of the Veins; here on the contrary the Motion is accelerated by their Deſcent.

And tho' likewiſe the Gravity or Weight of the *Blood* may ſeem to retard its Motion in climbing up by the *Arteries* to the *Head*, becauſe that which tends upwards by the *Arteries* is more ſpirituous and apter for Motion, and its Paſſage, by reaſon of the Directneſs of the Paſſages, eaſier, this ſaid Weight thus coming into the *Arteries*, is not to be conſider'd; but that the *Blood* which is hurried upwards, is more ſpirituous than the reſt, and therefore apter for Motion. Although we cannot preciſely determine how much Time is required for the whole Maſs of *Blood* to paſs through the *Heart*, and conſequently to perform its Circulation, yet we may be able to collect ſomething from what follows:

Firſt of all, That opening the large *Artery* of a Man, a Dog, or other ſanguineous Animal, the *Blood* will ruſh out with ſuch Force, that unleſs it be ſtop'd, Life will preſently be at an End; as the Famous *Lower* obſerv'd, in cutting both the *Carotids* of a large Dog, the whole Maſs of *Blood* flow'd out in the 20th Part of an Hour, and all this *Blood*, except what iſſues out at firſt, from that Moment ought to paſs through both *Ventricles* of the *Heart* and the *Lungs*.

I confeſs indeed, the *Blood* in this Caſe does not deſcribe the uſual Circuit of it, ſince it was not propel'd to the extreme Parts of the Body, and its Courſe, by reaſon of leſs Reſiſtance, was made the ſwifter; but it is probable that the Motion of the *Blood*, had it flow'd from the Extremities, might have been much retarded, when neither having

ving any fresh Matter added to it, or the Assistance of the Spirits, it could not be sufficiently driven forwards; so that considering all together, from the said Experiment we may conclude, that the whole Mass of *Blood* perfects its Course, and passes through the *Heart* often in an Hour.

In the next Place, The *Pulse* of the *Arteries*, at least in that Part we feel, consists in the Expansion of them by the *Blood* that is driven into them at every Constriction of the *Heart*; but since the *Arteries* are divided into almost an infinite Number of Branches that all *pulse*, it is necessary there should be a large Quantity of *Blood* thrown out from the *Heart* at every Pulsation, which is sufficient for the Expansion of all of them; and since in an Hour's Time there are above Three thousand Pulses made in a healthful Man, in some more, and others less, it is plain, that the whole Mass of *Blood* ought to be driven through the *Heart* frequently in the said Time.

But how much *Blood* flows from the *Heart* at every *Pulse*, we may make a nearer Calculation from the Capacity or Size of the *Ventricles* of the *Heart*, which, according to the common Assertion of Anatomists, in a Man of a moderate Stature contains two Ounces of *Blood*, or more; from whence *Lower* concludes, that there are so many Ounces expel'd from each Ventricle of the *Heart* at every Pulsation; but because the Measure of the *Ventricles* cannot be taken but in dead Bodies, in which the Parts are shrunk, and the *Blood* much condens'd, and because very likely the whole is not driven out at every Contraction of the *Heart*, but some remains behind, hence perhaps some may contend, that there is not such a Quantity expuls'd at every *Systole* of the *Heart*: Therefore let us suppose, that only one Ounce is sent forth from each *Ventricle* at a Time, it will follow, that there passes every Hour thro' the *Heart* at least Three thousand Ounces of *Blood*, which makes Two hundred and fifty Physical Pounds, each containing twelve Ounces; from whence supposing, that every Man contains in him fifteen Pounds of *Blood*, then the whole Mass ought to pass through the *Heart* sixteen times in an Hour; but if there be not above twelve Pounds of *Blood* in the Body, then twenty times. Neither do I doubt, but in those, who from a larger Make of Body, and greater Size of the *Blood Vessels*, have a greater Quantity of *Blood*, and also larger Cavities of the *Heart*, so they pulse out much more *Blood* at every Contraction.

The Accurate *Leewenhoeck* considering with a Microscope the Course or Circuit of the *Blood* in an *Eel*, observ'd it to be of that Swiftness, that in an Hour's Time, in going out and returning in, it made Two hundred and eighty eight Inches, twelve whereof make a Mathematical Foot, and therefore Four and twenty Feet in the whole; but how much the Course might be of the *Blood* in a terrestrial and more perfect Animal, he could not well understand, from the vast Number of *Blood Vessels*, which make the Body, as he said, of a red Colour: Therefore the Course of the *Blood* observ'd in the *Eel*, he thus applies to the Course of the *Blood* in a Man. If we suppose the *Blood* in our Bodies to be brought thro' the *Arteries* with the same Swiftness as that in an *Eel*, and the Extremities of the *Feet* or *Fingers* distant from the *Heart* four Feet and a third Part, or Fifty four Inches; therefore the *Blood* ought to be measured from the *Heart* to the Toes, and from thence to the *Heart*, nine Feet, or an Hundred and eight Inches; from whence it follows, that the *Blood* goes about from the *Heart* to the extreme Parts of the Feet, and back again, twice in a Hour and two Thirds. In like Manner he computes, that the *Blood* makes an entire Circulation four times in an Hour from the *Heart* through the Extremities of the Fingers, and more than that by a third Part; eight times in an Hour to the utmost Parts of the Head, and so in like Manner to the Parts nearer to the *Heart*.

The chief Cause of the *Circulation* of the *Blood*, is the Propulsion of it from the Heart into the Arteries, and the Constriction of the Arteries, which will be more fully consider'd in treating of the *Pulse*. The Use of this Circulation is, that the *Blood* may be convey'd to all the Parts of the Body, both for Nutrition and Accretion, as well as the Conservation of the Heat and Tone of the Parts. The Spirits and excrementitious Humours are by this Means mutually assisted and join'd together, and likewise secern'd from

m the other Maſs, the *Blood* it ſelf pre-
v'd from Corruption, and the Materials
m hence ſupply'd for *Semen* in Men, Milk
Women, and other Things requiſite for
neration, and the like; from whence it
plain, an infinite Number of Advantages
ſe to the Body, ſo that if this Motion be
p'd, it is impoſſible to ſupport Life. What remains to be diſcuſs'd, as to the Circulation of the *Blood* in a *Fœtus*, that paſſeth not thro' the *Lungs*, and both *Ventricles* of the *Heart*, as in Adults, we ſhall examine particularly by it ſelf, with what has been ſaid on that Subject by Meſſieurs *Mery*, *Tauvry*, *Buſſiere*, *Verheyen*, *&c.*

Of Fermentation *in general, in order to the better underſtanding of* Animal Fermentations, *and the Motion of* Animal Fluids. *Taken from the Philoſophical Tranſactions of the Royal Society, and the following Authors,* viz. Des Cartes, *Mr.* Boyle, *Dr.* Willis, Drake, *&c.*

BEfore we proceed to give any Account of the Production, Motions, and Alterations, of any of the other Fluids of a umane Body, it will be neceſſary to preiſe ſomething concerning *Fermentation*, to hich the Generation, Perfection, and Dey, of Animal Fluids, has, by a Conſent moſt general, been aſcrib'd. Fermentation a Word, that has been ſo much, and ſo riouſly, us'd by Authors, that it is beme very equivocal, and the Foundation of any unneceſſary and unedifying Diſputes, eer *Logomachia*. To obviate therefore any iſapprehenſions or vain Conteſts hereafter out the Meaning of a Word which we all have frequent Occaſion to uſe, we ſhall obliged to have Recourſe in this Place to finitions and Diviſions, a Method (tho' me may think it too formal and ſcholaſtick) diſpenſibly neceſſary to avoid Cavils, and ture Alterations, about Words we ſhall t trouble our ſelves to defend, but take re to be underſtood, leaving Elegance and e Propriety of Terms to thoſe who ſtudy em for other Purpoſes.

By Fermentation in general, we mean ſuch an eſtine expanſive Motion of the conſtituent Parts mix'd Bodies, as tend to a permanent Alteration of the Body fermented. By this we exclude all *Effervеſcencies*, *Ebullitions*, or *inteſtine Agitations* of Bodies reputed *ſimple*, by Violence of Fire, or other external Heat, which leave them, after cooling, in the ſame State they were before; ſuch as the boiling of Water or Milk, the melting of Metals, *&c.* For tho' in ſome of theſe, this Agitation from Fire will produce ſuch an Alteration in the Bodies, as will, in cooling, give the heavier Parts Leave to ſubſide firſt, and ſo leave on the upper Surface ſomething different in Appearance from the reſt of the Body; as in Milk, the Skim or Cream; and in Metals unpurg'd, the *Recrementa* or *Droſs*: Yet this, in the Caſe of *Milk*, being no more than an Acceleration of that Separation, which, without this adventitious Force, would naturally have happen'd; and in the other, ſuch a one as would never from any Prædiſpoſition in the Body have arriv'd; they might both be look'd upon as violent Separations, not properly ariſing from the Diſpoſition of the Mix'd, to which we reſtrain the Senſe of the Word *Fermentation*.

However, as *Fire*, or any other *Heat*, properly modified, ſerves to ſuſcitate and promote in Bodies naturally diſpoſed *true Fer-*

mentations, as in *Muſt*, and other naturally fermenting Liquors, the Heat of the Weather, or any other analogous artificial Heat, will do, we only exclude thoſe which are ſuddenly and violently produced by Fire. If any one will have thoſe we have excluded to be true Fermentations, we will not contend with him, provided, that as often as we mention *Fermentation*, he will not underſtand it of thoſe two Sorts, it not being the Intention of this Deſign to diſpute what may or may not properly be call'd *Fermentation*, but ſettle the true Underſtanding or Meaning herein.

The Alterations produced by Fermentation are in general Two: The Union of Bodies before diſtinct, or at leaſt the ſtricter *Incorporation* of ſuch, as (tho' looſely mix'd) were before not well united; or the manifeſt *Separation* of ſuch as were before, as to Senſe at leaſt, united and incorporated, and bore the Face of an uniform Body. *Fermentation* produces ſometimes *Incorporation* by ſimple *Solution* only, wherein the Body leſs fluid, is diſſolv'd and ſuſtain'd by the more fluid Body, and both together ſeem to make one Liquor or Subſtance. In this Caſe, the Fluid ſuſtaining is generally call'd a *Menſtruum*, as in Tinctures of *Reſinous*, *Metallick*, and other Bodies. This is generally artificial.

Sometimes this *Diſſolution* ſprings from a natural Tendency of theſe Bodies to *ferment* and *ſeparate*, or at leaſt to cohere more looſely than before, as in the *Putrefaction* of Animal and Vegetable Bodies, which is a Degree of this *ſolutive Fermentation*, that ſo entirely diſſolves the Union of the Parts, as to render them not only fœtid, but incapable of ever being reunited under the ſame Form, the more volatile Parts being ſo diſengaged from the reſt, as to ſtrike the Organ of Smelling at ſome Diſtance by their *Effluvia*, as all Animal Subſtances, if left to themſelves, will in ſome ſhort Time do, and in ſome morbid Caſes, beſides the Excrements which do it conſtantly, ſome Parts of the living Animal, as in *Ulcers*, *Apoſtemations*, *&c.* which *Effluvia* ſo ſent out, are not to be recollected by Art.

A leſſer Degree of this Sort of *Fermentation*, which does not ſo abſolutely enfranchiſe the volatile fœtid Parts, yet ſo far diſſolves the whole mix'd, as to looſen the Coherence of the Parts, and to diſpoſe them towards, or give them a Degree of, Fluidity, which they had not before, without ſending out any offenſive Exhalations, is called *Digeſtion*, and is that State to which the Aliment is reduced in the Stomach of Animals.

There are other *Fermentations*, which are *Depuratory*, and ſeparate ſomething from the mix'd, without deſtroying the Form of it. This is done two Ways, either by ſending a permanent Froth or Scum, as new *Wine*, *Ale*, and other fermented Liquors us'd for Drink, and is attended with a ſtrong and laſting Effervéſcence, to which if Vent be not given, it burſts the Veſſels, be they never ſo ſtrong, and is vulgarly call'd *Working*, by Artiſts *Deſpumation*. This is either ſpontaneous or natural, or artificial or forced. The other is by *Precipitation*, or letting fall ſome recrementitious Parts, which is uſually the Conſequence of a light *Fermentation*, without much Tumult or Diſturbance, in which ſome Parts, that before floated ſeparately in the Liquor, unite, and growing too heavy to be ſuſtain'd in it, fall down to the Bottom, leaving the Liquor clearer than before, as the *Lees* and *Tartar* of *Wines*. This is called *Fretting*, and is attended with a ſlight *Spumeſcence*. This too is ſometimes ſpontaneous, ſometimes forced by Art.

There is however another Sort of *Precipitatory Fermentation*, which is attended with a more immediate and violent *Effervéſcence* than any of the former. This happens not only between thoſe Bodies which the *Chymiſts* are pleaſed to call *Acids* and *Alkali's*, and is inſtantaneous, but follows as ſoon as the Bodies touch one another, and ſometimes before they ſeem to do ſo, that is, as ſoon as their *Effluvia* or *Exhalations* meet. Theſe are generally *ſaline* Bodies, and when both of them happen to be *in Fluore*, they conſtitute thoſe Liquors which the Artiſts call *Spiritus macri*, *ſaline*, *lean* or *hungry Spirits*, becauſe they ſuppoſe them deſtitute of *Sulphur* or Oil, at leaſt they appear ſo to them, being not inflamable, which is their Mark of *Sulphur*, however fallacious. To produce theſe *Coagulatory Fermentations*, one at leaſt of the Bodies muſt be a lean Spirit; if both be ſo, a violent *Ebullition* is produced immediately upon

upon their Mixture, which ſoon ceaſing, a *coagulate Salt*, compounded and partaking of both, is let fall to the Bottom, as *Tartar Vitriolate* from Oil of *Vitriol* and Oil of *Tartar*.

If the *Alkalious* be a dry Body, whether *teſtaceous* or *ſaline*, the *Acid* let fall upon it, raiſes an immediate and conſiderable Effervelcence, tho' not ſo great and violent as between the Fluids, yet greater with the *ſaline* than the *teſtaceous*, and more durable with both than between the *Fluids*. When the acid Salt has inſinuated it ſelf into the Body of the *Alkali*, the Ebullition ceaſes, and a mix'd or neuter Body is form'd out of them, which Manner of concorporating different fermenting Bodies, is by the *Chymiſts* likewiſe call'd *Coagulation*, as the *Magiſtery* of *Pearl* from Powder of *Pearl* and *Vinegar*, or any other *Acid*.

There are divers other Sorts of *Fermentation*, not reducible to any of theſe Heads, which it would be endleſs to enumerate, they appearing to be almoſt as various and numerous as the ſeveral Bodies that will ferment with one another. But the Effects of moſt of theſe *Fermentations* ending with the Act, *viz.* neither producing any *Deſpumation*, *Precipitation*, *Coagulation*, or any other Separation, or other permanent Alteration whatſoever, other than ſimple Mixture would do, it may be ſufficient to mention the principal Accidents that attend ſeveral of them during the Activity of their *Ferments*. Theſe may be call'd *Anomalous Ferments*, ſince they are not to be brought under any certain *Claſſis* or *Rules*.

Among theſe Anomalous Kinds, may be reckon'd that *Fermentation* which is rais'd in *Dough* by *Yeaſt* or *Leven*, in which, altho' there be a notable Intumeſcence or Swelling of the Maſs, yet it produces no other conſiderable Alteration in the Property; neither is that laſting, unleſs the Maſs be baked in an Oven, or otherwiſe harden'd by the Fire, which hinders the Parts from ſubſiding again, as left to themſelves they naturally would do. *Bread* is indeed accounted the more wholeſome, and eaſy of *Digeſtion*, for this *Fermentation*, whence ſome would infer an eſſential Alteration in the Qualities of the *Maſs*: But that is a Miſtake; for that Lightneſs and Eaſineſs of *Digeſtion* is altogether owing to the Rarity of the *Texture* introduced by the *Leven* or *Ferment*, aſſiſted and promoted by the Heat, whence the Parts touching one another in fewer and ſmaller Surfaces, become more eaſily ſeparable in the Stomach.

Of the ſame Kind is the *Fermentation* of ſome *Pharmacopœal* or Shop Preparations, made of a Mixture of Ingredients, ſome aromatick and volatile, others viſcous, whoſe Intumeſcence ariſing from a Tendency of the volatile Parts to eſcape thro' the viſcous, is not attended with any Separation, or other manifeſt Alteration of the Qualities of the Mixture, which, after the Fermentation is over, being well agitated, as ſuch Preparations uſually are, bear one uniform Face, as other officinal unfermented Electuaries do. Of this Sort are *Venice Treacle*, the *Philonia*, *&c.* made with Honey, or other viſcous fermentative Subſtances. Theſe Fermentations being ſluggiſh, tho' the Intumeſcence be great, produce no very notable Degree of Heat.

There are other *Anomalous Fermentations*, which tend neither to the Perfection nor Union of the Bodies fermenting, yet are attended with a prodigious Ebullition, and moſt intenſe Heat, even to actual *Inflammation*, between ſome of 'em, as between ſtrong *Aqua fortis*, or Spirit of *Nitre*, and rectified Oil of *Turpentine*, or diſtilled Oil of *Cloves*, *&c.* which end in the Deſtruction of the Subject, leaving nothing but a *Calx* behind. An actual Flame or conſuming Fire is ſometimes likewiſe produced by occult or ſmother'd Fermentations, as Countrymen to their Loſs experience, when their new Hay is made up into great Cocks or Ricks before it be well dried.

An intenſe Heat may likewiſe be produc'd by Fermentation without any viſible Effervelcence, as when Oil of Vitriol is mix'd with Water, which will heat a Glaſs or metalline Cup ſo as not to be endured by the naked Hand, yet without any Ebullition. The ſame, or indeed much greater, Heat it produces pour'd upon Spirit of Wine, with the ſame Appearance, except a Change in Colour, and upon Vinegar, and moſt of the *Acids* of the lower Claſs.

To ſolve the great Variety of different Appearances ariſing from the ſeveral Sorts of

Fer-

Fermentations, *Hypotheſes* almoſt numerable have been fram'd which their Authors have endeavoured to accommodate to the many ſurprizing *Phænomena* which this one Part alone of natural Mechaniſm furniſhes. But with how little Succeſs they have generally attempted theſe Difficulties, as it may perhaps be thought Arrogance to ſay of the Labours of Men ſo eminent, and ſo much more able, ſo it muſt be thought Ignorance not to know, ſince, by the Nature of this Undertaking, we are obliged to offer our own Senſe concerning 'em, tho' perhaps what we ſhall offer, may only add to the Heap of exploded Opinions.

The narrow Limits to which we are in this Place circumſcrib'd, will prevent us from entring into the Liſts too far againſt great Men, to whoſe Judgments we readily ſubmit as far as Truth will give us Leave, we are not here ſolemnly or formally laying down a compleat *Theory* of *Fermentation*, nor oblig'd to refute every *Hypotheſis*, which we think to be inſufficient, nor even ſo much as to account for all thoſe different *Phænomena* which we have already mentioned: But for thoſe only which have a Share in the Animal Oeconomy, and eſpecially in thoſe Parts of it, of which we ſhall be oblig'd to ſpeak in treating of thoſe *Problems*, which ſeem neceſſary to this Work.

Common Conſent of Phyſicians and Naturaliſts has in a Manner reduc'd the general *Theory* of *Fermentation* to two *Hypotheſes*; one deſcended from the Doctrine of *Democritus*, *Epicurus*, and their later Followers; the other from *Paracelſus*, *Helmont*, and the modern *Chymiſts*. The firſt pretend to ſolve all the Difficulties occurring in this Part, which is none of the leaſt or moſt intelligible of Phyſical Knowledge, by the Concourſe and Agreement of Atoms, which, according to them, are the Seeds of all natural Bodies, and *Principles* of all Phyſical Action floating in the *Atmoſphere*, and which, by their fortuitous Concourſe or Concurrence, either unite and ſettle quietly, or, by their Contranitency and Reluctance, occaſion all theſe natural Buſtles of which we have been ſpeaking, which the Diverſity, Contrariety and Infinity of theſe *Seeds* or *Principles*, they think make not hard to be conceiv'd.

The *Carteſian Notion*, which moſt of the *French* Philoſophers embrace, in this Point at leaſt, is a Refinement upon the foregoing, and eſtabliſhes a ſubtle Matter or *Æther*, which having a conſtant rapid Motion pervades the Pores of all Bodies, *fluid* or *ſolid*, *Diaphanous* or *Opake*; and while the Pores of the pervaded Bodies keep their wonted Station and Diſpoſition, the *Æther* paſſes ſwiftly, but quietly through them, without ruffling or diſcompoſing the Body however fluid and eaſy diſturb'd. But if by Mixture, accidental Means, the Courſe of theſe Pores be ſo interrupted and broke, as create any Obſtacle to the Paſſage of the ſubtle Matter, it raiſes Commotions gentle or violent, till it has open'd a free Paſſage for it ſelf, or has rent the Body to Pieces. This Doctrine they illuſtrate by the celebrated Inſtance of the *Glaſs Drops*, which, by breaking off the Tip, are ſhatter'd into a Million of Pieces in an Inſtant.

Though neither of theſe Opinions contain any Thing abſurd, or that can be demonſtrated to be untrue, yet without Offence we may ſay, they are unſatisfactory, as being too general, and abſtracted, even ſo far as to be alike applicable to every *Phænomenon* and in equal Degree which will not anſwer particular Circumſtances. For if we be ask'd, why *Yeaſt* mixt with *Ale* or *Dough* makes 'em ſwell or *Ferment*; according to to the *Atomiſt's Hypotheſes* we muſt anſwer, that the Intumeſcence ſprings from the Jarring or Diſagreeing of *Atoms*, that cannot lie quietly together: According to the *Carteſian Syſtem*, that the Continuity of the Pores, being by this Mixture broken, the Tumult is rais'd by the *Æther*, which is ſeeking or forcing a new Paſſage. But what is the Diſagreement of the *Atoms*, or Interruption of the *Pores*, and wherein it conſiſts, and why the *Fermentation* is one Caſe haſty, violent and ſhort, in another, ſlow, languid and durable, are Queſtions that theſe abſtracted *Theories* make no Anſwer to. And when thoſe that Philoſophize from 'em undertake to do it, their Anſwers are generally ſuch as have no Dependance upon their *Theories*, or ſo Precarious or Arbitrary as a Judicious Inquirer cannnot acquieſce in, and he might as well take up with the old Peripatetick

tetick Juggle of *Sympathy* and *Antipathy*, hich he might deal about and diſtribute as his Diſcretion he ſhould think fit.

By the great Number and Variety of Exriments which the *Laboratory* and *Furnace* pply, the *Chymiſts*, or as they affect to call emſeves, the *Philoſophers* by *Fire*, ſeem betfurniſh'd for an Argument of this Kind an any others. But howſoever it has fallen t, whether through the Arrogance or afted Obſcurity of ſome, and the ſlender terature of others, which have render'd em unfit for a free and rational Philoſoy, they have been no happier than the reſt, ough more conceited, and have generally aſon'd about the *Phænomena* which they w, rather like ſervile *Operators*, than great inded *Philoſophizers*.

The Eſſences of *Paracelſus*, the *Archæus*, *as*, *Blas*, *&c.* of *Van Helmont*, notwithanding all their Boaſts, give us as little ight into the Nature of Things, as the ocult Qualities of *Ariſtotle*, and in Spight of eir barbarous *Cant*, which, as a *Veil*, they ould throw over their Ignorance, and their fected Myſteries, by which they would ſs for profoundly Knowing and Reſerv'd. e may ſee their real Defects, and that they op'd about as much in the Dark, as others hom they ſupercilioufly overlook'd.

The *Salt*, *Sulphur*, and *Mercury*, of ſome, d the five Principles of others, which are e ſame with the former, with the Addion of *Phlegm* and *Caput mortuum* only, by emſelves confeſs'd to be unactive, are too rrow a Bottom to build a ſolid and ſubntial Philoſophy upon, as the Honourable r. *Boyle* has ſufficiently demonſtrated: Much s then are we to hope for univerſal Soluons of *Problems* of this Nature, from thoſe at abridge them yet farther, and reſolve all to *Acid* and *Alkali*. The wretched Shift hich theſe *Pyrotechnites* make, and the haſty onclufions they draw from a few ill unrſtood Experiments, are ſufficient to give Man a Surfeit of ſuch aukward *Philoſophy*. t were theſe Men qualified with ſufficient arning, and a liberal Education, yet were impoſſible for them, upon their Principles, arrive at any conſiderable Degree of naral Knowledge, or to know any Thing re than their Eyes would inform them of, thout any Uſe of Brains.

For taking their Principles in the largeſt Extent, including their *Spirit* or *Mercury*, *Salt*, *Sulphur*, *Water* and *Earth*, as they call their *Phlegm* and *Caput mortuum*, it is impoſſible for any Man to make any Progreſs in real Knowledge upon them: Nor is the Multitude of *Phænomena* which the *Laboratories* of ſuch Men produce, any Argument againſt what is here advanced, nor any Proof of their Skill, any more than a blind Man's throwing Stones, and hitting ſeveral People in a Crowd, is an Argument of the Exactneſs of his Aim. They have indeed named ſeveral Sorts of Bodies, which they would have not only to be *generical*, but the *real* and *univerſal* Materials of all other Bodies. If they were ſo, Would the Certainty of that inform us how, and in what Manner and Proportion they were mix'd, and acted upon one another, ſo as to produce the vaſt Variety of *Beings*, *Animate* and *Inanimate*, and their ſeveral Properties which offer themſelves to our Conſideration? No; they are ſo far from that, that thoſe Bodies which they call *Principles*, and which, to deſerve that Name, ſhould be the moſt *ſimple* in *Nature*, are ſo variouſly compounded, even to *Indefinity*, that they who uſe the Terms in *common*, have not one *common* Meaning, but are forced, when they talk and write to one another of thoſe Matters, to allow a vaſt Latitude of Conſtruction; and perhaps it is not once in ten times, when they diſcourſe of their Principles, eſpecially if they apply them to the Solutions of particular *Phænomena*, that the *Speaker* and the *Hearer* underſtand their Terms ſtrictly alike, how much ſoever they may ſeem agreed.

For Example: The *Chymiſts* agree in making *Sulphur* the Ground and Cauſe of *Smell* and *Colour*, a Notion founded upon a ſlight Experience, that ſome *Vegetable*, or as they call them, *Eſſential Oils*, carry the *Smell*, and will ſometimes, upon Mixture with other Things, impart the Colour likewiſe of the Plant or Flower from which they were drawn; yet they have never been able to ſettle their *Idea* of *Sulphur*, or to come to any generally allow'd Determination, what Bodies they comprehend under that Name, and what they exclude, ſo that they have aſſign'd Properties and Functions to they don't know what.

How-

However, upon this, and other Terms altogether as equivocal and uncertain, they found all their *Theory*, which is in all their Writings arbitrary and precarious. Ask any of these Philosophers by Fire to account for the Colour and Smell of a *Rose*, he will tell you, that they spring from the *Sulphur*; and ask him, why sometimes the *Smell* is more vigorous or languid than at others, and he will answer, that it comes from the Exaltation or Depression of the *Sulphur*: But ask him, what *Sulphur* in general is, and you shall either have no Answer at all to it, or that it is an *unctuous inflamable Substance*, by which Answer you are never the nearer the End of your Question: For if you demand further, how *Unctuosity* and *Inflamability* contribute to the Production of *Colour* or *Odour*, he is at the End of his Line, and you must rest contented with his Word that they do, without any further Inquiry into the *Modus*. If at any Time you produce them any very high coloured or odorous Body, which, by all the Torture of their Art, will not afford any unctuous inflamable Substance, they will however positively tell you, that it is there conceal'd in the *Concrete*, tho' they are not able to extract it, and rather blame and condemn their Art, than their own Reasoning. Neither will they allow it to be any Argument against them, that a great Number of Bodies, which have the Characteristick Mark of *Sulphur* in the highest Degree, have very little Colour, and no Scent, as Oil of *Olives*, and Abundance of others, which are *transparent*, and pretty near limpid, and will burn till they are quite consum'd, without affording any considerable *Smell*. Even that particular Body from which they denominate this pretended *Principle*, is not it self an *unctuous* Substance, nor does it upon the *Analysis* yield any. That which the *Chymists* call Oil of *Sulphur*, is an *acid* Liquor, neither *unctuous* nor *inflamable*; so arbitrary and unaccurate are they in their Terms. Besides this, there are Multitudes of other *Contretes*, which they call *sulphureous*, that do not answer both their *Tests*, and many neither of them, which it would be endless, and besides our Purpose, to name.

We have not chosen out this, as more liable to Exception than the rest; any of those which they call the *Active Princip*[les] would have afforded us as ample a Fie[ld] For there is not one of them under wh[ich] they do not comprehend a Thousand Bod[ies] of different Natures, of which many [are] absolutely repugnant to, and destructive [of] one another, as manifestly appears from [the] Mixture of different *Salts*, in which b[oth] *Acids* and *Alkali's* lose their separate Prop[er]ties, and are confounded in a Substa[nce] which they have been pleased to call *Neu[tral]* for Want of Skill to range and class the[m] tho' Abundance of that Kind be of Natur[al] own Production, as *Sal Armoniack*, which [is] both *natural* and *artificial*. The same may [be] said of their *Mercury* or *Spirit*, by wh[ich] they understand every Thing that is *volat[ile]* how contrary soever to one another the [se]veral *Species* may be; as Spirit of *Hartsh[orn]* and *Nitre*, and innumerable others, wh[ich] mix'd together, produce the most violent [Ef]fervescencies that we know, and in the E[nd] destroy the distinguishing Properties of o[ne] another.

Notwithstanding this Narrowness of t[he] *Chymical Principles* in their largest Exte[nt] there have some arisen who would yet [re]duce them to straighter Limits, and solve [the] *Phænomena* by *Acids* and *Alkali's*, under wh[ich] they pretend to class all Bodies whatsoev[er] *Mineral*, *Vegetable*, or *Animal*. This *Hy[po]thesis* has all the Imperfections of the form[er] and Thousands more. But not to give o[ur]selves much Trouble about it, it has o[ne] *fundamental Flaw*, which, like a Constitutio[nal] Distemper, will not suffer it to be long liv[ed] which is, that what *Acid* is, or what *Alk[ali]* none of its Favourers have ever yet be[en] strictly able to define, but have been forc[ed] to shuffle the same Body from one Class [to] another, as Occasion required. Thus *Vi[ne]gar*, when pour'd upon any *testaceous* Bo[dy] is reckon'd by them an Acid, because [it] raises an Effervescence; but when Oil [of] *Vitriol* is pour'd upon it, and an insufferab[le] Heat is thereby produced, it is (accordi[ng] to them) an *Alkali*, to preserve their *Hy[po]thesis*, which supposes a Necessity of an *A[cid]* and *Alkali* in all *Fermentations*.

This *Hypothesis* is the Product of the *L[a]boratory*, and calculated for this one *Phæ[no]menon* of *Fermentation* only; and as it is [the] Offspring of weak unskilful Parents, so

firm and insufficient for that single of which its *Favourers* have been made en sensible, that many of them, when re press'd to define what they mean by erms, say, that an *Acid* is that which ferment with an *Alkali*, and an *Alkali* which will ferment with an *Acid*. Those have had the Address to avoid being so ess'd, are however as arbitrary in their unts, and call this an *Acid*, and that an , just as the Occasion requires, with- ssigning any Reason why they range under those Heads, but that, in their ion, they must be both there, otherwise could be no *Fermentation*; and he that be so gracious as to allow that, may, any Cases, make which he pleases the or the *Alkali*, without any Opposition them.

had scarce been worth while to have so much Notice of these absurd Opi- s, had they not crept so far into Phy- as to pervert the Understandings, and uch the Reasonings, of many, who rwise might have employ'd their Talents ood Purpose, and given Opportunity to ident *Quacks* and *Empiricks* to prate about gs they did not understand, and banter People with *Cant* without Reason. There o Doubt but *Chymistry* affords very great itions to, and Improvements of, the Art Healing, and the Theory of Physick, and those who are ingenuously and honestly ersant in the *Laboratory*, have Oppor- ties of making many luciferous Obser- ons, when their Thoughts are not cramp'd confin'd to the Furnace, which has sent the World so many scandalous *Empi-* , who, trusting to a few præstigious ks which that has taught them, have os'd upon the less considering Part of kind, who easily believing that they could do Things to them so surprizing, Masters of all the Secrets they boasted ave to their Peril confided in them upon Reasonings; tho' they might as well have mpted to account for all the Motions of ock by *Acid* and *Alkali*, or *Salt*, *Sulphur* *Mercury*, as what they pretended to.

he Founders of the Chymical Philoso- were certainly very unwary in circum- bing themselves to such *narrow Principles*. any Reason that appears to the contrary, they might have allow'd themselves Five hundred, as well as Five, by which Means they would have avoided those miserable Shifts they have been put to, to save the Appearance of their Principles; nor need they have rank'd Bodies directly opposite and destructive of one another under the same Class, as they are frequently forced to do. When we consider what a Variety of *Hypostatical Principles* there are, which their Simplicity, as to Sense and our *Analysis*, may make warrantably pass for *Second* or *Subaltern Principles*, higher than which a *Chymist* cannot mount, because his *Laboratory* cannot inform him farther, it is a Matter of just Wonder, why they should restrain themselves, when they might have taken a warrantable Liberty, and been justified by the Productions of their Furnaces. They could not but know, that many of those Bodies which they call *Mercury* or *Spirit*, were as essentially distinguish'd from one another, and by as indelible Characters, as *Sulphur* is from *Salt*, or *Salt* from *Mercury*, and so on. Had they therefore enlarg'd the Number of their Principles, and not required them all, or any stated Number of 'em in every Body, they had taken away from their Opposers innumerable Occasions of Triumph, which upon the present Foot are unavoidable.

That *Principle* alone, which they call *Mercury* or *Spirit*, includes divers *Species* of Bodies, which nothing but the arbitrary Humour of such *Chymists* could reconcile to one Head. The volatile *acid* and *alkalious Spirits* are not only different, but opposite: The *vinous inflamable Spirit* is specifically different from either of them; and there is another *vegetable Spirit*, which has not yet receiv'd a classick Name, that differs as much from them all, and is neither manifestly *acid*, *alkalious*, *vinous*, nor *inflamable*, and yet is a very *brisk active Spirit*, will ferment very durably with Spirit of *Nitre*, yet not so much as turn the Colour of *Syrup* of *Violets* either Way; I mean, that Sort of *Spirit* which is drawn from *Scurvy-grass*, *Horse-radish*, and all that Tribe of *biting Plants*: And there may be a great many more as specifically distinct, if their Properties were nicely enquired into, which this unaccurate Way of Classing has confounded in the general Mass. Even among the very manifest

Acids themſelves, and the ſtrongeſt of them, we find very conſiderable Differences, which ſeem not to be owing to their Acidity, but to ſome other Qualities, yet no otherwiſe diſcover'd, than by the Properties which flow from them. Thus *Aqua fortis* will diſſolve *Silver*, and not *Gold*; and *Aqua regia* will diſſolve *Gold*, yet not touch *Silver*; and *Oil* of *Vitriol*, which ſeems to be as high an *Acid* as either of them, will not act upon either, but will diſſolve *Iron* more readily than they. This evidently ſhews, that thoſe Qualities which the Chymiſts ordinarily aſſign as the Diſtinguiſhing and *Characteriſtick Marks*, do not ſufficiently diſcover their Properties and natural Relations to one another, and that conſequently a more accurate Diviſion is neceſſary to make them ſo uſeful as the Chymiſts would pretend, and (without vain Exaggeration) they might really be, if conſider'd as they ought.

The ſame may be ſaid of their *Salts*, under which Head they claſs all Sorts of Bodies that are *ſapid* and *ſoluble* in *Water*, whatſoever Contrariety or Repugnancy they may have to one another in their own Natures. Theſe perhaps are the moſt reaſonably claſs'd of all their pretended Principles, notwithſtanding the Variety and Difference that is to be found among them; becauſe they anſwer the generical Trial, and taſt more uniformly than the reſt of their *Active Principles*. But when they come to make it a Principle or Producer of many of thoſe Qualities which they pretend to fetch from it, they argue as abſurdly as from any other Part of their *Philoſophical Romance*.

Their other two, *Phlegm*, and *Caput mortuum*, which are by all of them reckon'd as unactive, and therefore by many thrown out of the Liſt of *Principles*, are liable to as many Exceptions, in Proportion to the Uſe they make of them. But it is not proper to ſpin out this Digreſſion any farther. They that believe what we have already ſaid againſt their *Principles* to be reaſonable, will be ſatisfied with that: They that do not, will require more Conviction than my Deſign gives me Room for here, and muſt have Recourſe to thoſe Authors that treat exactly on this Subject, and will undoubtedly, if they be unprejudiced, find it in that elaborate Piece of the Learned and Ingenious Mr. *Boyle*, call'd the *Sceptical Chymiſt*.

That the Reſolution of Bodies into their *viſible Elements*, or the moſt *ſimple Parts* that hitherto Art has ſuggeſted any Way to find, is of great Uſe to Phyſicians, is paſt Controverſy, as well from the conſtant Uſe which Phyſicians, both in their *Theory* and *Practice*, make of ſuch Bodies, as from the Neceſſity they have of Recourſe to ſuch Things as they can upon Occaſion procure and apply, with ſome Knowledge of their Operations and Effects: For tho' thoſe Bodies be not ſo abſolutely ſimple, as in *Natural Philoſophy* to deſerve the Name of *firſt Principles*, yet ſince they have ſuch conſtant and regular Effects, as we are not able to prevent, without firſt corrupting them, and are the ultimate *Reſults* of the minuteſt *Analyſis* we have been hitherto able to make, they may very well be reaſon'd upon as *ſubaltern* or *ſecond Principles*, which are the Inſtruments that Phyſicians muſt uſe, who are not able to govern Matter and Form, or Matter and Motion, abſtractedly conſider'd, which, tho' they may afford pleaſing *Speculations*, and perhaps true ones too, are not reducible to *Practice* and *Experiment*; and therefore of no real Benefit to Mankind, without the Intervention of ſome ſuch intermediate *Principles* as theſe.

It would therefore be a very great Service to all Sorts of *Mechanical Operations*, to redeem theſe *ſecond Principles* from that Obſcurity and Perplexity into which the *Chymical Philoſophers* have, either thro' Want of Judgment, or Ingenuity, plung'd them; and perhaps by claſſing theſe Bodies, in Appearance ſimple, in a clear Method, according to their ſeveral diſtinguiſhing Qualities and Effects, many Doubts, now very perplexing, might be reſolv'd, and many Ends anſwer'd, which now remain as *Deſiderata*, as well in all other Arts, as in Medicine, which (we hope) will be ſufficient to induce thoſe who have Means and Capacity, to contribute their Endeavours to ſo neceſſary a Work, for the Relief of Humane Infirmities, in which they will have the Advantage to find the Field more pre-occupied than in any other Part of Natural Knowledge, and Room enough for the Induſtry and Improvement of Ages yet to come.

But to return to our immediate Subject, *Fermentation*, which is, notwithſtanding the Endeavours of Some to fling it out, one of the main Wheels of *Animal Oeconomy*; we have endeavour'd to ſhew, that the *Corpuſcularian Hypotheſis* is too general, and abſtracted to account ſatisfactorily for the *Phænomena* of particular *Fermentations*. However true it may be, that what is laid down in it is the Ground-Work of all, and is no better a Direction in Practice, than it would be to a Traveller, to tell him that *Lyons* was a City in *France*; if he that was to go thither, had no better Means of inquiring his Way, 'tis probable he would never get thither. *Chymiſtry*, like a particular Map, ſeems to promiſe a more certain Direction in ſome Parts of Phyſical Knowledge. But as it has been manag'd, like an ill *Map*, it points us only to ſome few conſpicuous Parts, without any meaſur'd Diſtances or Degrees of *Longitude* and *Latitude* to guide us certainly in our Way, and leaves us to hunt out the Place we would arrive at, whether to ſtumble fortuitouſly upon it, or by immethodical Inquiries of I don't know whom, or how to find it out.

We are indeed oblig'd to thoſe ingenuous *Operators* in *Chymiſtry*, who, without Bantering us with falſe Reaſonings, communicate to us what their Labours and Inquiries have made certain to them, and like thoſe honeſt Country Men, who, without *Clock*, *Watch* or *Dyal*, look up to the Sun, and tell us, as nearly as they can gueſs, ſincerely what Time of Day it is, which, though we cannot depend upon to a Minute, will however ſerve us to proportion our Speed by, if we know the Length of the Way. To the Hints which ſuch *Chymiſts* afford, we owe all the Improvements that have been made in the *Theory* of *Animal Fluids*, and though they are not often to be met with, one good *Chymiſt* makes Preparation for two *Charlatans*, with all their vain affected Myſteries and Miſchievous *Arcana's*.

Having premis'd thus much concerning *Fermentation*, in order to remove ſuch Prejudices as have been entertain'd concerning it, and ſhew the Neceſſity of a more particular and leſs exceptionable *Rationale* of this ſurprizing Method, by which Nature works in the Production of moſt of her conſiderable *Animal* and *Vegetable Phænomena*, it will be neceſſary to offer ſomething farther. And here it will not be improper to remind the candid Reader, that as we have no where denied the Exiſtence of the *Æther* of the *Corpuſcularians*, nor its Activity in the Productions of this particular great *Phænomenon*, *Fermentation*, but have thought their Solutions too ſlightly circumſtantiated to give any great Satisfaction or Light into a Part of Nature ſo abſtruſe, and to clear up all Doubts concerning it; ſo on the other Hand, we muſt frankly avow, that many Circumſtances of this *Phænomenon* alone, plead ſtrongly for the Exiſtence of ſome ſuch *ſubtle* Bodies, which permeate all others with the utmoſt Degree of Celerity and Rapidity imaginable, otherwiſe it wou'd be hard to account for that violent Motion, which is inſtantaneouſly produc'd between Bodies, that were, to Appearance at leaſt, before at Reſt, eſpecially if *Nil dat quod non habet* be in this Caſe a true Axiom.

The *Chymiſts* on the other Side exalt, and think the Power and Contrariety of their *Acids* and *Alkalies* ſufficiently demonſtrated, ſince, from the Commixture of thoſe oppoſite Bodies that they range under theſe Heads, moſt of thoſe ſudden and violent *Effervеſcences* ariſe. Neither could this *Fermentative* Oppoſition be denied to 'em, if they were contented to lay no more upon it than it would fairly bear. But when they pretend their *Tria Prima*, their *Salt*, *Sulphur* and *Mercury*, or even with the other Two, *Water* and *Earth*, added, to be the *Hypoſtatical Principles* of all Bodies, and the ſole efficient Cauſes of all the Properties and Accidents that belong to or befall them, they give all thoſe that are ingenuouſly ſtudious of promoting real and true natural Knowledge, juſt Provocation to refute and expoſe them. For to adjuſt all Manner of *Phænomena* to the largeſt of their *Hypotheſes*, we muſt confound all our *Idea's* of natural Bodies, and range them ſometimes under one Principle, ſometimes under another directly oppoſite; as for Example, when the *Spirit* or *Phlegm* of *Vitriol* ferments with Oil or Salt of *Tartar*, or Spirit or Salt of *Hartſhorn*, an *Hypoſtatical Chymiſt* will roundly call the *Spirit* of *Vitriol* an *Acid*, and the other Bodies *Alkalies*. But what, will he call the ſame *Spirit* of

Vitriol when it ferments with Oil of *Vitriol*, another *Acid*, and not only ſo, but drawn from the ſame Body by the ſame Operation, without any different Circumſtance neceſſary to produce it, but a little more Time and Fire? The ſame may be ſaid of all their very high *Acids*, which will ferment with a lower Claſs, tho' they differ, only *ſecundum Magis & Minus*, no more than in Degree.

Since therefore *Fermentations*, and thoſe not a few, may be rais'd without the neceſſary Colluctation of an *Acid* and an *Alkali*, an ingenuous *Chymiſt* would lay them aſide, as no *true Principles* of *Fermentation*, and conſider them only as *Inſtruments*, which, whenever certainly both preſent, highly promoted that Operation, in which all rational Inquiries muſt go along with him, or reject indubitable Fact. But then he muſt go out of the Sphere of his own Activity, his Laboratory, for it, to which the working *Chymiſts* have been generally ſo bigotted, that they have commonly neglected all that was to be learn'd without the Furnace, as not conducing to their End, and too ignoble for their Ambition or Avarice.

But whether *Chymiſts* will be ſo condeſcending or not, the *Corpuſcularian Principles* are not ſo ſtrait laced, but that they may to very good Uſe receive the *Chymical Acid* and *Alkali*, ſo as not to make them *Hypoſtatical*, or the ſole conſtituent Parts of all Bodies, and employ them with good Succeſs in the Solution of many natural *Phænomena*, concerning which they have been uſed to reaſon too abſtractedly and remotely to draw any very uſeful practical Inferences from. Thus tho a *Corpuſcularian* ſees a violent *Fermentation* rais'd between two Bodies, and imputes it to ſome Obſtruction thereby created to his permeating *Æther*, yet he is at a Loſs for the Reaſon of this Obſtruction, and why rather between the two Bodies before him, than ſome others, that ſeem more likely to produce it.

The *Hypoſtatical Chymiſt*, who from Experience knows, that thoſe Bodies do conſtantly and regularly exhibit thoſe Appearances, is as much at a loſs why; but without aſſigning any Thing mechanically capable of exciting ſuch Motions, abſurdly feigns natural *Inclinations* and *Averſions* in *inanimate* Bodies. But the *Corpuſcularian Chymiſt*, who applies the *Mechanical Principles* to the *Phænomena* of the *Laboratory*, avoids both theſe Difficulties, as well immediate and particular, as remote and general, as Mr. *Boyle* has very happily experienc'd, particularly on this Subject of *Fermentation*, by ſuppoſing the *Acid* to be *ſharp* or *pointed Bodies*, like little Blades of Knives, and the *Alkalious* to be *porous*, like ſmall Sheaths, into which the *Acids* are forcibly driven by the rapid Stream of *Æther* conſtantly pervading both Bodies, tho' not in equal Meaſure, but in Proportion to their Number and Capacity of their reſpective Pores, which Agitation cauſes firſt a very furious Ebullition, till the Pores of the Mix'd are diſpos'd regularly for the Paſſage of the *Æther*, and next a *Precipitation* or Subſidence of thoſe Parts, which being engaged mutually, or impacted into each other, grow ſuperficially heavier than the Fluids which before ſuſtain'd them; and therefore, after their *Coalition*, or as the *Chymiſts* term it, *Coagulation*, ſink down, and leave a free Paſſage to the *Æther* thro' the mix'd Liquor, which thenceforward remains to outward Appearance one uniform homogeneous Fluid, where the *Coagulation* does not unite the whole Subſtance; or otherwiſe, the Parts of either Body are ſo minutely broken or mix'd, as to ſwim quietly together under one Form, without *Precipitation*, and are to Appearance uniform, though not ſimple.

But this Way of Solution by a mix'd *Chymico-Corpuſcularian Hypotheſis*, however ingenuous and rational, tho' it ſeems juſtly to take Place in thoſe haſty *Fermentations* which are produced by the Mixture of manifeſt *Acids* and *Alkali's*, leave us yet ſome Room to doubt its Sufficience, when applied to other Kinds of *Fermentation*, where the Concurrence of an *Acid* and *Alkali* are not ſo evident. For tho' the Violence of the Motion, and the Suddenneſs of the Expanſion, in ſuch *Fermentations* as we have been juſt now treating of, ſeem to require the Activity of the *Æther*, or ſome other Body of equally rapid Motion, and general Influence, which will as little fall under the Examination of our Senſes, to give Life to the *Acid* and *Alkali*, or other *Principles* of the *Chymiſts*, which, whatever they dream of, or feign of their Activity, are of themſelves as

ggiſh and inactive as thoſe they call ſo; d even their moſt viſibly active Principle, t, is perfectly dead, unleſs invigorated and liven'd by Solution in ſome of that *Phlegm* hich they ſo much deſpiſe: Yet there are me *Fermentations*, to which it cannot be ov'd that both theſe *Chymical Principles* con- r, and ſome to which perhaps neither of em do, and whoſe leiſurely, unprovok'd, ntle Intumeſcence and Deſpumation ſeems t to need, much leſs to have, any ſuch olent forcible Agitation, as the Interrup- n of the Courſe of the *Æther* is pre- m'd to be attended with. Of this leiſure- gentle Kind, are all thoſe which Nature es towards the Perfection of thoſe Pur- ſes wherein ſhe uſes this Way of Opera- n, as in the Maturation of *Fruits*, and re *natural Liquors*, made of their unmix'd ices, *&c.* which I ſhall therefore call *Na- ral Fermentations*, according to a Diſtinction eady laid down; and thoſe that ſhall pro- ed in a Manner analogous to theſe, *Spon- neous*, altho' they may happen to have been ſt produced, or afterwards produced by rt, unleſs it be by the manifeſt Colluctance *Acids* and *Alkali's*, all which we ſhall ll *Artificial* or *Violent*, and have already counted for in general, by the *Chymico-Cor- ſcularian Hypotheſis* of that Noble Philoſo- er Mr. *Boyle*, to whom all the Curious are ernally indebted.

Under the Artificial or Violent *Fermenta- ns*, may be comprehended all thoſe that ring from the mutual Action of a mani- ſt *Acid* and *Alkali*, and ſome others which range with them, becauſe of the Share hich high *Acids* have in ſuch *Fermentations*, d that they are accountable for by the me *Hypotheſis*; ſuch are the *Ebullitions* rais'd the Diſſolutions of *Gold*, *Silver*, *Copper*, n, *Lead*, *Quickſilver*, *Coral*, *Pearl*, &c. in *qua regia*, *Aqua fortis*, *Spirit* of *Nitre*, *Oil* *Vitriol*, *Spirit* of *Salt*, *Tartar*, *Allum*, *Juice* *Lemons*, *Vinegar*, &c. the former of which etallick and natural Bodies, tho' the *Chy- ſts* arbitrarily rank them among the *Alka- s*, only becauſe they *ferment* with, and are ſolv'd by, *Acids*; yet they proceed therein y precarioufly, and without Authority, ce all their Skill in *Analyſis* could never ch any Thing directly *alkalious* out of 'em. ith more Juſtice might they have reckon'd *Nitre*, *Vitriol*, &c. among the *Alkali's*; for theſe will not only *ferment* with each other, but with their own *acid Liquors*, and over and above, upon Incineration, afford a true *lixivial fix'd Salt*; yet theſe were never accounted *Alkali's* by them, perhaps upon the Score of their yielding ſuch an Over-ballance of *Acid* on the *Analyſis*.

Whether it may be altogether ſo reaſonable to exclude thoſe *Inflammatory Effervеſcencies*, which ariſe from the pouring a highly rectified *Acid* upon the volatile diſtilled or eſſential Oils of Vegetables, from the Number of thoſe caus'd by *Acid* and *Alkali*, is ſomewhat more a Queſtion: For tho' theſe be what they call the *Sulphurs* of thoſe Bodies, and that *Sulphur* taken ſtrictly to their Meaning, be neither *Acid* nor *Alkali*, as being a Principle, and as ſuch independant of *Acid* and *Alkali*, which are only two Claſſes of another Principle, *viz.* Salt; yet the *Chymiſts*, pretending that none of their Principles are to be extracted pure, eſpecially *Sulphur*, may alledge, as they really do, that theſe *Sulphurs* are highly charg'd with the volatile eſſential Salts of the Vegetables, which they may ſay is alkalious; and that tho' the actual Inflammation, which enſues upon ſome ſuch Mixtures, proceeds from the *Sulphur*, which is their Inflamable Principle, the Effervеſcence is owing wholly to the Contrariety of the Salts of the two Liquors. But this is ſaying without proving, according to their uſual arbitrary and unaccurate Way: And therefore, till they plainly demonſtrate the volatile Salts of Plants to be *alkalious*, and to have ſuch an Antipathy to *Acids*, it will be ſafer to acquieſce in the general Solution, that the Parts of the *Acid* inſinuating themſelves in great Plenty into the Pores of the *Oil*, the Paſſage of the *Æther* was ſo interrupted, as to occaſion an Exploſion ſo violent to diſlodge them, as was ſufficient to produce an actual Flame, which catching hold of the *Oil*, its moſt ordinary *Pabulum*, it continued till all the *Oil* was conſumed, but without any further Ebullition or Exploſion, the Paſſage being clear'd at once. They that conſider how little Countenance the Spirit of *Scurvy-graſs* gives to the *Alkalioufneſs* of *volatile vegetable Salts*, will be apt to require more Proof than a vulgar *Chymiſt*'s bare Word.

For

For beſides the *Phænomena* I have already mention'd from that Spirit mix'd with ſtrong *Spirit* of *Nitre*, it continued to ſend up numerous Bubbles, as often as I pull'd out the Cork, for ſome Days, and retain'd both Smell and Taſte entire, tho' ſomewhat overpower'd by thoſe of the *Nitre*, yet very plainly to be diſcern'd thro' the other. The ſame Thing it did, but more vigorouſly and plainly, mix'd ſeverally with *Vinegar*, Juice of *Lemon*, but without any Efferveſcence, Heat or Ebullition, and was taſted as freſh in 'em, tho' mix'd with a much larger Quantity, as Sugar could have been, the Smell in the mean time overpowering thoſe of the *Vinegar* or *Lemon Juice*, without deſtroying or damping either of them; ſo that the putting 'em together, ſeem'd to have no other Effect than that of ſimple Mixture. Theſe, and divers other Trials, as well with *Alkali's* as *Acids*, convinc'd me, that it belong'd to neither of thoſe Claſſes, ſince it neither deſtroyed, nor was deſtroy'd by any of them: Therefore, till I can be convinced what thoſe Salts are which are ſuppos'd to float in vegetable eſſential *Oils*, and what Share they have in theſe extraordinary Fermentations, I ſhall content my ſelf with the foregoing Solution, and range them among the *Anomalous Fermentations* of the *Chymico-Corpuſcularian Hypotheſis.*

There are other *Anomalous Fermentations*, which are excited by the pouring of corroſive acid Liquors upon divers Bodies of very diſtinct Kinds, which might be accounted for by the foregoing *Hypotheſis*; ſuch as thoſe between *Oil* of *Vitriol*, *Spirit* of *Nitre*, *Aqua fortis*, *&c.* and *Simple Water*, *Spirit* of *Wine*, *Spirit* of *Scurvy-graſs*, *&c.* of which it is ſufficient to my preſent Purpoſe barely to have made Mention: For not deſigning a compleat *Hiſtory* and *Theory* of *Fermentation* at large, but ſuch a reſtrain'd one only as ſhould have Regard to the *Theory* of *Animal Oeconomy*, we ſhall be particular only upon thoſe Kinds, which either have been already uſed to illuſtrate and explain ſome Parts of the *Animal Oeconomy*, or hereafter probably may be put to that Uſe by others. Having therefore ſpoken of the principal *Fermentations* rais'd by high *corroſive Acids*, which I have call'd Artificial or Violent, becauſe the main Inſtrument that produces them is procured by great Art and Violence of Fire, [illegible] paſs over the reſt, in Hopes, that if what [illegible] the Courſe of this Work we ſhall have [illegible] ſay againſt ſuch Sort of Illuſtrations, be [illegible] any Weight, we ſhall not for the future [illegible] troubled with any precarious *Theories*, [illegible] will ſtand in Need of ſuch fallacious Su[illegible] ports.

We come now to thoſe gentle Kinds [illegible] *Fermentation*, which we have ventured [illegible] call *Natural* or *Spontaneous*, not but that [illegible] know even theſe are ſometimes procure[illegible] and often promoted, by Humane Skill a[illegible] Induſtry; but becauſe they work in ſuch [illegible] Manner as Nature her ſelf does in many [illegible] her Productions, and are urg'd on by ſu[illegible] Means as are of her furniſhing, or ſo mu[illegible] reſemble thoſe, that they ſeem as it were [illegible] her preſcribing.

Leaving here the *Laboratory*, and all i[illegible] pompous *Apparatus*, we muſt return in[illegible] that of Nature, where every Thing is pe[illegible] form'd by a Method and Inſtruments mo[illegible] ſimple, and by a Mechaniſm therefore [illegible] much more wonderful, as its Effects ſurp[illegible] in Beauty, Variety and Uſe, thoſe of H[illegible] mane Art. Into this Field likewiſe th[illegible] *miſts* have attempted to thruſt their Sick[illegible] and to limit the Operations of Nature to th[illegible] narrow Principles of their Art, and to a[illegible] count for all the viſible *Phænomena* of th[illegible] three Kingdoms, into which (according [illegible] their Jargon) they divide the Terraqueo[illegible] Globe by their *Tria Prima* or Five *Princip*[illegible] dividing as arbitrarily among them the ſ[illegible] veral Effects of Nature, as if they had be[illegible] the Authors, but with as little Judgment [illegible] if they were not rational *Contemplators.*

In the Sort of *Fermentations* we are no[illegible] to ſpeak of, *Air* is the principal Inſtrume[illegible] the firſt Mover; in theſe, neither the Ch[illegible] mical Principles, nor their *Acid* and *Alk*[illegible] have any Thing to do: For tho' in many [illegible] the Bodies fermented this Way, ſome [illegible] their Principles, and ſometimes all, may u[illegible] on *Analyſis* be found, yet it is pretty pla[illegible] that neither they, nor their *Acid* and *Alk*[illegible] as ſuch, contribute any Way to the *Phæ*[illegible] *mena* produced. We ſhall not pretend [illegible] determine, what Share the *Æther* or *Ma*[illegible] *ria ſubtilis* of the *Corpuſcularians* or *Carteſ*[illegible] may have; becauſe we do not know ho[illegible] far that may enter the Compoſition of th[illegible]

regate *Fluid*, which we call *Air*: But we be apt to think, it has not much to do his Sort of *Fermentations*, otherwise than it makes a Part of the Compound. *Air*, how many soever different Sorts of Parles or Atoms it may consist, is agreed to a *springy elastick Body*, *compressible it self*, *able by its Weight to compress others*, which the only Qualities necessary to the pre- Purpose.

It is farther found by Experience, that all ts of Bodies, whether *fluid* or *solid*, that not too hard to yield to such Tryals as Curious have been hitherto able to make, ntain in them a greater or less Proportion included *Air*. The *Torricellian* Experints, and Mr. *Boyle*'s *Air-Pump*, yet more ply and sufficiently have demonstrated, at even the most *dense* of *Fluids* contain a nsiderable Quantity of it, and that some dies reckon'd among the *Solids*, are not stitute of it. Though in these latter the oportion is not so easily found, because ese Bodies do not so readily yield to Comession or Elasticity, yet that many of these include no small Quantity, the Dissolun of *Bones*, made in Mr. *Papin*'s *Digestor*, fords us reasonable Grounds to believe; o' the Materials of which that Engine ust necessarily be made, not being Diaphaous, we cannot observe the Gradations or eps made towards that Solution.

Divers Naturalists have offer'd curious peculations concerning the Vegetation of *lants*. Some have employed themselves bout the Material Principle from which ey receiv'd their Augmentation: Others bout the Vessels through which it was coney'd, and the Means by which it was ais'd; Speculations which we have nothing do withal here, any more than to enquire, whether the different *Species* spring from *eminal Principles* really and unalterably iffering, or from the same Matter variously odified by several and peculiar Organs. All that shall be offer'd in this Case is, That e suppose that their various Degrees of *Vetation* depend upon the different Degrees of Expansion or Rarefaction of the *Air* conain'd in their several Juices, which will be reater or less, as external Circumstances and he Texture of the Vessels of the several lants themselves concur to affect or admit it. Thus we see the same *Species* of Plants promoted or retarded in their Growth, even in the same soil, by the Encrease or Decrease of Heat, whether *Artificial* or *Natural*.

In these *Fermentations* of Liquors, which are partly Natural, partly Artificial, those are observed to be forwardest which are most impregnated with *Air*, as we find in *Must*, *new Malt Liquors*, &c. It has been found in Mr. *Boyle*'s Engine, that those Liquors which are specifically lightest, abound with most *Air*, as appears by the different Degrees of *Bubbling* and *Intumescence* upon the Exsuction of the *Air*. This to me appears to proceed from no other Cause, than that, by taking off the incumbent Weight, Opportunity is given to the included *Air* to dilate and expand it self: For tho' some Liquors will in that Engine bubble more than others that swell more in Bulk, and are *specifically* lighter, yet this seems to depend not only upon the Quantity of the *Air* included, but upon the *Viscosity* of the Liquor it self, whose Surface will not so easily break without first rising as it were in *Blisters*.

The common Experiment which Boys make of blowing *Bubbles*, evinces this pretty plainly; for tho' in simple Water it will not succeed, yet if a little Soap be incorporated with it, it will bear being blown up to a very great Degree, so as to be let fly from a Pipe in pretty large Bladders, and so float for a considerable Time in the open *Air*, and last more or less Time, according as the Body of the Water, which makes the Shell of the Bubble, is more or less extended at its first parting from the Pipe. So in the Engine, *Oil* of *Olives* affords more, larger, and more lasting Bubbles, than Water, which are owing to the lightness arising from the Quantity of *Air*, and the Senacity of the Liquor. *Spirit* of *Wine* yields more numerous, but less lasting, Bubbles, and swells higher than Water; and *Oil* of *Tartar per Deliquium* affords very few, and no Intumescence. These Experiments compar'd, shew, that the *Specifick Gravity* of *Fluids* depends upon the Quantity of *Air* they include, and that the Largeness and Duration of the *Bubbles* is owing to the Consistence of the *Fluid* through which the *Air* that composes them makes its Way. Let it be no Objection hereafter, when we come to apply this Doctrine

ctrine to *Animal Fluids*, that all theſe Experiments we inſtance in here, are made upon the Product of *Vegetables*; for the ſame Trials have been made upon Animal Liquors, which anſwer equally according to their *Specifick Gravity* and *Tenacity*, tho' it be not proper in this Place to recite them.

It has been a general Obſervation, and is in the main true, tho' it does not always prove ſo, that the more mix'd and compounded a Liquor is, the more ready it is to *ferment*. Of this Obſervation the *Pyroſophiſts* have made great Advantages, pretending, that all the Tumult and Buſtle that is obſervable in thoſe Liquors, ariſes from the Jarring and Diſagreement of their Principles. This (in my Mind) makes rather againſt, than for, their Philoſophy; for if their Principles, whether they make *Two*, *Three*, or *Five*, muſt needs be the *Elements* or *Hypoſtaticks* of all Bodies, it ſeems more natural, that they ſhould readily cloſe and cement, than by ſuch a Diſagreement break that Union, and diſcompoſe that Body, in which at laſt they muſt coaleſce. But as indeed they have never brought any ſatisfactory Proof, that all Bodies muſt be compounded of their Principles; ſo neither does it appear, that this Tumult in mix'd Bodies ariſes from them; and therefore this Obſervation makes neither for or againſt them, ſaving that it ſhews them arbitrary and unaccurate in their Accounts. But *heterogeneous* Liquors, containing Parts diverſly figured, do not ſubſide ſo cloſe as the more *homogeneous*, whoſe Parts, from the Congruity of Figure, ranging cloſe together, admit of leſs *Air* in their *Interſtices*, and conſequently are leſs obnoxious to a tumultuous Rarefaction, which is what is call'd *Fermentation*.

For as Mixtures may be made of a great Number of *Fluids*, without any ſubſequent or laſting *Fermentation*, as of *Water*, *Wine*, *Sugar*, and *Juice* of *Lemons*, &c. ſo there are ſome other, which, after having become as to Senſe *homogeneous*, are upon every ſlight Occaſion, as a little Motion, or ſtanding warm, prone to effervеſce very ſtrongly, as *Diacodium* will do, that ſeems as little or leſs compounded than many that will not do it ſo readily, nor to that Degree; which plainly ſhews, that it is not bare Mixture, but an internal Diſpoſition in ſome *Fluids* greater than in others, that occaſions the differ Degrees of *Fermentation* under the ſame ternal Circumſtances.

The expreſs'd Juice of *Grapes*, which call'd *Muſt*, is a Liquor that abounds w Air, as its *Specifick Gravity* ſhews; and the fore readily ferments, and flings up to t Surface a Sort of Scum abounding with A which is call'd the *Flowers*, and conſiſts ly of ſome of the more *viſcous Parts* imb with ſome of that *Air*, which has made Eſcape thro' the thinner Part of the Liqu as appears by the Texture of it, which is ly a Heap of little Bladders fill'd with A which, during the Time of *Fermenta* heaves and ſwells it into many *Bliſters* on t Surface, which laſt like the Bubbles whi Boys blow, till that viſcous *Cortex* is ex tended beyond the Coheſion of its Parts, an then break. The ſame happens to *Malt L quors*, and others compounded of light an viſcous Bodies, the Flowers of all whi conſiſt of Particles in that Reſpect reſem bling each other, and which, if cut throug when dry, or near it, ſhew a ſpongy Te ture, abounding with little Cells of in cluded *Air*. This *Yeaſt* or *Flowers* of *Wi* or *Beer*, if put to Liquors that ferment bu ſluggiſhly, will, as common Experience ſhews make them work very briskly.

The *Chymiſts* may perhaps pretend, that i is the *Acid in Fluore*, with which the Flowers abound, that occaſions this *Fermen tation*. But then there will be two Difficul ties for them to anſwer: Firſt, Where is th *Alkali* upon which thoſe *Acids* ſhould ope rate as ſuch? For none of theſe Liquors a ford any, but from the *Incineration* of the *Lees* or *Tartar*, to produce which, or a leaſt to diſengage them from the Bodies in which before they were ſtrictly united, Vio lence of Fire is required; and that if befor really exiſtent, was ſo implicated in othe Bodies, as not to contribute any Thing t the Operation they would lay at its Door And next, Why thoſe Flowers of *Wine* o *Beer*, which (after keeping) will grow ver ſowr, but will ſubſide, and let out a grea deal of the *Air* they before contain'd, ſhoul not operate more briskly in this State tha in the former, which, if their Activity lay in the *Acid*, they muſt neceſſarily do? Bu Experience demonſtrates juſt the contrary an

d ſhews, that they may be kept till they e very ſowr, and abſolutely unfit for rcing *Fermentation*.

They that attribute the *Fermentations* of Vine, and other Liquors of that Sort, to e Activity of the *volatile vinous Spirit*, and ould have that put the reſt in Motion, have leaſt more Shew of Reaſon on their Side: or it is evident from Fact, that this *Yeaſt* or *lower* of *Wine* or *Beer*, affords in Proportion nore *inflamable Spirit* than the Liquor it ſelf fter this Purgation. But then why ſhould ot this *Spirit*, when extracted and defæcated y Diſtillation, act more vigorouſly, and erment the Liquor more violently? On the ontrary, it will not in the leaſt move it. Among all the Experiments of *Artificial Fer-entation*, there is not one that countenances he Notion of its proceeding from an *Acid*, xcept the ſalting of *Leven* only; which hoſe that would derive all Sorts of *Fermen-ations* from *Acid* and *Alkali*, pretend to be lone in order to impart an *Acid*, and ſo exalt he *Ferment*; whereas they miſtake the Mean-ing of thoſe that do it, which is only to preſerve it from growing muſty and ſtink-ing.

All the reſt ſhew plainly, that their Action depends neither upon *Acid* or *Spirit*, nor in ſome can the moſt bigotted *Chymiſt* diſcover any of theſe. When ſome Wines, whoſe Colour is not inconvenient for ſuch a Me-thod, ferment ſluggiſhly, or want to be re-fermented, the skilful *Wine-Coopers* uſe *Whites* of *Eggs*, whip'd up with a *Whisk*, ſo as to be very light and ſpumeſcent, which they ſtir into their Wines, and ſo ſet them again upon the *Fret*.

It can't be pretended, that there is in this Caſe either *acid* or *vinous Spirit*, or indeed any Thing natural in the *White* of *Eggs*, ex-cept their *Viſcoſity*, that contributes to their *Activity*. By Means of that indeed, it in-viſcates, and engages the *Air* upon Conquaſ-ſation, and thereby becomes capable of be-ing equally mix'd thro' the Body of the Li-quor, and conſequently of raiſing ſuch a *Fermentation* as the *Artiſt* wants, before it can extricate it ſelf: For the *Air* being in this State compreſs'd, does, by its *Elaſticity*, na-turally tend to recover its former Degree of Expanſion, and not being able to do it all at once, by Means of Exploſion, occaſions a continued *Series* of Succeſſions *quaquaverſum* in the Liquor, by which Means ſeveral Con-currences and Combinations of the ſeveral Particles that float in it are occaſion'd; whence follows that Subſidence of the heavier which is call'd *Precipitation*, as the Motion it ſelf is *Fermentation*.

But if theſe, and all other Methods of *Fermentation* hitherto mention'd, might be ſuſpected of ſome ſecret latent Quality in the Ingredients uſed to procure it, there re-mains yet one in Uſe among the skilful Brewers of *Wine*, and other Liquors, which is, beyond all Poſſibility of Exception, exempt from ſuch a Suſpicion. This is the Way of doing it by Bellows only, in which they uſe a large Pair of Bellows, with a Stop-cock upon the Snout, the End of which is thruſt thro' a Perforation made on Purpoſe in the End of the Veſſel, from which the Liquor is to be driven thro' the Cock at the other End into another Cask, which, in caſe of prick'd Wines, is generally furniſh'd with a rich ſpirituous Lee, with which the Wine, by Means of this Impregnation with *Air*, is made to ferment, incorporate, and repurge it ſelf again; and by this Means decaying Wines are frequently reſtored and made ſound, and ſometimes better than at firſt.

In this Caſe, neither *Acid*, nor *Alkali*, nor Spirit, nor any other imaginary Agent, ex-cept *Air*, can have any Thing to do; be-cauſe nothing elſe is mix'd but Wine, which ſimply put together, will not ſucceed ſo, let them agitate them how they pleaſe, unleſs ſomething be added to them which is incor-porated with more *Air* than the Parts of the *Wine* it ſelf. It is true, that *Vitriol*, *Arſenick*, and ſome other Bodies not ſo impregnated with Air, will in the high-coloured Wines help to ſtrike the Tincture deeper; but they are ſo far from forwarding the *Fermentation*, that they check it, and haſten the *Precipitation* of thoſe heavy Parts, which, by an Union with them, are carried down along with them.

It may not be improper here, though not directly to our preſent Purpoſe, to take No-tice, that Wines thus fined down, as the Vintners call it, may purge themſelves en-tirely from theſe dangerous Drugs by their abſolute Subſidence; yet if the Wines re-main never ſo little upon the *Fret*, it would be very hazardous to drink of them in that

State. The Design of this does not oblige us to go through the *Theory* of *fermented* Liquors, though there are scarce any of them which may not be accounted for, as demonstratively as Physical Matters will bear, by one or other of the Ways already laid down; especially those which tend to the Perfection or Exaltation of the Liquor, that is, to render it more *spirituous* or manifestly vinous, which is the only *Fermentation* which some will allow to be a true one. We need not in this Place make any particular Application to Animal *Fermentations*, because that must be done in its proper Place, when we come to speak of the Animal Fluids, call'd *Spirits*, *Chyle*, *Lympha*, *Serum*, *&c.* In the mean time, we have thought thus much about *Fermentation* in general proper, to prevent a Confusion of *Idea's*, or unnecessary Repetitions.

Dr. John Mayow's *Treatise of the Motion of the* Animal Spirits, *to which some Things are added concerning the Motion of the* Brain, *&c.*

CHAP. I.

The different Opinions of the Authors concerning the Manner of the Contractions of the Muscles *are examin'd.*

THAT there is a certain nitro-aerious Spirit transfer'd by Means of the Respiration into the sanguineous Mass, unto which its Fermentation and Incalescency owes its Origine, has been shewn by us in another Place: And now I must add, in relation to this same Spirit which is drawn in by Inspiration, that the same bares a considerable, or the greatest, Share in the performing of the Animal Motions, which Opinions, as maintain'd by me before, I continue to assert at this Time also; not because that being devoted to any preconceiv'd *Hypothesis*, I am resolved, as it is commonly done, to defend it to the utmost, whatever it be, but because I judge it most consonant to Reason.

The Manner or Method by which Motions are perform'd, is so obscure, that its Disquisition has proved no less troublesome to the modern Anatomists, than in former Ages it did to the ancient Philosophers; just as if Nature did take Delight to expose our humane Frailty or Ignorance, since even those Things which we feel every Day in our own Hands, and perceive with our own Eyes, seem nevertheless the most remote from our Apprehension and Understanding.

Among these Things, *Motion* challenges most deservedly its Place; for we are so far ignorant as to the Manner of its being perform'd, that scarce believing our own Eyes, its very Existency is sometimes call'd in Question, it being one of the most celebrated Questions in Dispute among the Schools, *Whether there be any such Thing as Motion?* The Sophists were so very positive in former Ages, that there was no such Thing, that its very Existency had been quite denied long before this, had not the Motion it self in its very Action been obliged to stand up in its own Defence, and convinced the Philosopher by the Peripatetick or Circumambulation.

Now when all these Difficulties have been raised concerning Motion in general, in how much more Obscurity is the Animal Motion involv'd, where we see very bulky Bodies to produce very stupendious Motions, and that

at of their own Accord, and to our no nall Surprize?

'Tis beyond all Diſpute, that the Animal lotion is perform'd by the Contraction of e Muſcles; but in what Manner this their ontraction is perform'd, is ſtill much con-overted by the Authors. The moſt com-on received Opinion nevertheleſs is, That e Fibres of the Muſcles are inflated, ſo that eing tumefied or render'd broader in Breadth, ey are contracted in Length.

This Inflation of the Fibres is by the moſt ngenious Dr. *Willis* explained in the follow-ng Manner, in his Exercitation of *Muſcular Motion, viz.*

'That the Animal Spirits being convey'd from the Brain by Means of the Nerves to the Muſcles, are ſtored up in the Tendi-nous Fibres like as in ſo many commo-dious Storehouſes; that the Spirits, ſo ſoon as the Impulſe is given of performing their Function, do make their Sallies out of the Tendinous into the Carneous Fibres, where meeting with ſome other active Particles of a different Kind, which are ſupply'd by the Blood, they go in an Inſtant into ſuch an Efferveſcency, as that, by the mu-tual Striſe of both, and the Exagitation of the Carneous Fibres, which are porous and lax, they are ſtuffed up and drawn into Corrugations, and that from all theſe Corrugations on both Sides the Contraction of the Muſcle does proceed; but that, af-ter this Contraction ceaſes, the pure Spirits that are remaining behind and ſettled, do again retract for a great Part into the Ten-dinous Fibres, ſo as to leave the other Particles in the Carneous Fibres behind them: And that laſtly, the Loſs of theſe is made good by the Blood, as that of the others is by the Nerves.

'To bring the Spirits that are laid up in the Tendinous Fibres from thence into the Carneous Fibres, in order to perform the Functions of Motion there, *the ſaid Inge-nious Gentleman ſuppoſes*, 'that there is re-quired a certain Impulſe or Inſtinct, or *Symbolum* communicated by the Nerves; and this *(he ſays)* is perform'd by ſome other Spirits convey'd thither from the Brain, *viz.* theſe Spirits which flow into the Parts, do, by their various Appulſe 'upon the Muſcles, diſpoſe the implanted 'Spirits to the different Motions either of 'Expanſion or Retroceſſion.

This *Hypotheſis* of the moſt Learned Dr. *Wil-lis*, I muſt confeſs, is very ingenious; but after all, in my Opinion does not in all Re-ſpects ſeem conſonant to Truth: For firſt of all, this beforeſaid Inflation of the Fibres is ſubject to various Difficulties, and ſuch as are not of the leaſt Moment; for in caſe it were ſo, that the Contraction of the Muſ-cle did proceed from the Inflation of the Fi-bres, it would of Neceſſity follow, that the Muſcle being in its Contraction diſtended outwards, muſt ſwell up into a much great-er Bulk; whereas it has been found by Ex-perience, that a contracted Muſcle is drawn cloſer together within it ſelf, that it becomes hard, and that if it is not leſſen'd, at leaſt it is not tumefied ſo much as is required for its Contraction, in caſe the ſame be ſuppoſed to proceed from an Inflation of the Fibres, as it has been long ago obſerved by the Learned Dr. *Lower*.

And tho' it ſeems in ſome Muſcles when they are contracted, as if we can feel ſome-thing of a Tumour, this, in my Opinion, is not owing to their being tumefied, ſo much as to the Muſcle's Belly's being in its Contraction moved towards the fix'd or immoveable Tendon, ſo that this Aſcent of the Muſcle does repreſent, tho' falſly, a Tu-mour, when it ſtrikes againſt the Hand laid upon the Muſcle.

Beſides that, if there were any ſuch Thing as an elaſtick Matter lodged betwixt the Ducts of the Fibres, which did produce this Inflation as beforeſaid, how could it come to paſs, that theſe Fibres ſhould fall or ſub-ſide again in an Inſtant? As it happens in the Twinkling of an Eye, and in the other different and momentaneous Contractions of the Fibres; for I can't comprehend, in what Manner this elaſtick Matter ſhould be able in a Moment's Time to cauſe an Inflation in the Fibres, and extricate it ſelf in the ſame Inſtant from thoſe Ducts or Channels: For if it be ſuppoſed, that after this Matter is rarefied, the Paſſage is eaſy for it out of the Fibres, it would immediately paſs through the Fibres without producing any ſuch In-flation.

Furthermore, it ſeems not very probable, that the Animal Spirits ſhould, in the Relaxation of a Muſcle, retreat out of the carneous into the tendinous Fibres; it being not eaſie to be conceived, that it is that could diſpoſe or direct theſe Spirits into this Motion of receding or retreating. Beſides that, ſince, according to the Opinion of the ſaid Learned Dr. *Willis*, the Animal Spirits which make their Sallies into the Fibres, do meet therewith other Particles carried thither, and that in a very great Quantity, and immediately go together with them into a mutual Efferveſcency, it ſeems, as if theſe Spirits would be either quite diſſipated, or elſe tranſmuted into ſomething of a quite different Nature of what they were before, and that conſequently they would not be qualify'd to renew ſuch another Efferveſcency.

In relation to the chief Part of the Muſcle that is contracted, it is very probable, that not the Fibres, but rather the Fibrils, which run, and are tranſverſedly inſerted into them, are contracted, as ſhall be ſhewn hereafter.

As to what concerns the Intumeſcency of carneous Fibres, which is to be obſerved near the Place where any Ligature is made in them, it is to be obſerved, that this ſeems to owe its Cauſe rather to the Blood, which paſſes through thoſe Parts, than to the Motion of the Animal Spirits being interrupted; for in caſe ſuch a Fibre, when it is in ſuch a State of Tumefaction, be wounded, the Blood will come forth plentifully. Beſides, that the Tumour will continue near the Ligature, even after the Muſcle being relaxed, the Contraction ceaſes, at which Time the Animal Spirits, according to Dr. *Willis* his Suppoſition, ſhould not break out forward from the Tendinous Fibres; but on the contrary, retreat backwards into them.

However, I can't but agree with the ſaid Dr. *Willis* in this Point, *viz.* That the Contraction of the Muſcles does proceed from the Particles of different Sorts, being intermix'd within the Compages of the Muſcles and entring into a mutual Efferveſcency, as ſhall be ſhewn hereafter.

I am not ignorant, that the Learned *Steno*, in his *Specimen* of *Myology*, publiſhed not very long ſince, is of Opinion, that there is not the leaſt Occaſion for the Acretion of any elaſtick Matter for the Contraction of the Muſcles, conſidering that the ſame, according to his Opinion, may be produced by the ſole Immutation of their Figure, *viz.* 'If a Muſcle from a *Parallelogrammum obliquæ Angulum*, is changed into a *Parallelogrammum*, the Angles of which are not ſo acute, which is ſuppoſed to happen thus in the Contraction of a Muſcle, then is the ſame contracted in Length, and at the ſame Time tumefy'd without the Acceſſion of any new Matter"; as may be ſeen in the 5th *Fig. Tab.* LXXXI. where let the Muſcle *a, b, c, d,* be contracted *c, d, e, f*; now this Muſcle, though of the ſame Bigneſs as before, nor is augmented by the Acceſſion of any new Matter, is nevertheleſs contracted in Length, and beſides this riſes into a Tumour towards *f.*

But it does not ſeem probable, that the Fibres of the Muſcle ſhould be diſpoſed to ſuch a Motion, without the Acceſſion of ſome Matter into them; for conſidering that the *Compages* of a Muſcle, before it is contracted, is laxe or looſe, it ſeems as if the Fibre *f.* could not be brought outwards toward *f.* but rather on the contrary inwards.

Furthermore, if it be ſuppoſed that a Muſcle, after its Contraction, is of the ſame Bigneſs as before, and is not increaſed by the Acceſſion of any new Matter convey'd to them, how comes it to paſs, that in the State of its Contraction it becomes ſo tenſe and hard? As it is obvious to every Body, by only laying his Hand upon the Part where the Contraction of the Muſcle is made.

Laſtly, what is it that could contract theſe Fibres, and bring about this Immutation in the Muſcles, if there were nothing of an additional Afflux into that Part? Beſides that, it is very confident, that a certain new Matter is thro' the Nerves carry'd to the Muſcle, without which the Contraction of the Muſcle can't be accompliſhed; for in caſe that Nerve which is directed to a certain Muſcle is cut aſunder, there will be no Contraction in that Muſcle for ever after.

'Tis true, it can't be deny'd, but that in caſe it be taken for granted that there is an Acceſſion of ſome certain Matter, which flow-

wing into the Muſcle, produces its Con-ction, that then this Contraction may be compliſhed by the ſole Mutation of its Fi-re, as it is repreſented in the foreſaid Fi-re, in which, whilſt the Muſcle *a, b, c, d.* inflated by the moving Influx, it muſt of ceſſity follow, that the Fibres *a, c.* and *d.* in reſpect of the Tendon *c, d.* which is ppoſed to be immoveable, are carried to-ards ſtraight Angles, and that the other oveable Tendon beſides this be carried out-ards, ſo that the inflated Muſcle will be *d, e, f.*

For this Muſcle, without undergoing any her Mutation, may, according to the Ac-ſſion of the new Matter which it receives, extended and inflated by that Matter; nd when this Variation as to its Figure hap-ens in the Muſcle, it will tumefy in Breadth, ut be contracted in its Length; and thus a Muſcle may be ſhorten'd, without its Fibres ſuffering any Contraction.

But whether this Variation may take Place in a Muſcle, and whether its Contraction does depend on that alone, I will not pretend to determine; tho', according to my Opinion, the Tumefaction in a contracted Muſcle does not ſeem to be ſo much as is required to produce its Contraction after that Manner. Beſides that, I can't conceive or ſee what Part of the Muſcle it is that's affected by the Impulſe of the moving Matter in ſuch a Contraction, ſince it would be requiſite, that rather Membranous Veſicular Bodies, than the Muſcular Strings, ſhould ſuffer this forcible Contraction; whereas the Strength of the Muſcle ſeems to ariſe rather from the Fibrils, and its Strings, than from any Veſicular Bodies or Membranes. But of all this we ſhall have Occaſion to ſay more hereafter.

CHAP. II.

A ſhort Deſcription of a Muſcle; *as alſo which Part of the* Muſcle *is contracted.*

IN the Anatomy of the Muſcles, the firſt Thing that offers it ſelf to your Sight, is he Membranous Integuments wherewith very Muſcle is cover'd on all Sides; next o which the *Series's* of the Carneous Fibres nake their Appearance, which being paral-el themſelves, are inſerted with oblique Angles into the oppoſite and parallel Ten-dons, according to the Obſervations made irſt of all by *Steno.*

Further you may obſerve the moſt ſurpri-ing *Series's* of an almoſt infinite Number of Membranous Fibrils, which being all paral-el to one another, do paſs tranſverſly the Carneous Fibres, but with oblique Angles, *viz.* theſe *Fibrils* are inſerted into the Car-neous Fibres after the ſame Manner (but in an oppoſite Situation) as the Carneous Fi-bres are into the Tendons; and as the Car-neous Fibres by their cloſe Conjunction ſeem to form the Tendons, ſo the Collection of the Fibrils ſeems at leaſt in ſome Meaſure to make up the Fibres themſelves, as may be ſeen in *Tab.* IXXXI. *Fig. 6.* in which are repreſented the *Series's* of the Fibres, and of the Fibrils, as they are conſpicuous in the Muſcles after they have been boil'd for a conſiderable Time.

It has been the conſtant Opinion of the Authors with us, that the Carneous Fibres of the Muſcles were chiefly thoſe that entred into a Contraction; but according to our Opinion, 'tis not the Fibres, but the Fibrils, which are inſerted tranſverſly into them, which have the greateſt Share in the Muſcular Contraction, as may be gather'd from very probable Indications.

For in caſe this Contraction did lie in the Carneous Fibres, then it would be required to perform the due Contraction of a Muſcle, that the Fibres ſhould be much more ſhorten'd in Length than the Muſcle it ſelf; for the Fibres being not diſpoſed according to the Length of the Muſcle, but inſerted obliquely into the Tendons, as you may ſee it in the beforeſaid Figure, it follows, that the

the Contraction of the Muſcle muſt be much leſs than the Contraction of the Fibres; whereas to make a due Contraction of a Muſcle, it is required that the Fibres be much more contracted than the Muſcle it ſelf, and (according to my Opinion) there is no ſuch great Contraction of the Fibres actually exiſtent in the Motion; for beſides that in the Diſſections of living Animals there is no ſuch Contraction of the Fibres to be obſerved, in caſe the Carneous Fibres were tumefied to ſuch a Degree, the Muſcle muſt of Neceſſity augment into a great Bulk, which we ſee does not happen ſo.

But if we ſuppoſe the Contraction of the Muſcle to be perform'd by the Fibrils, there is not ſo much Need of ſo great a Contraction and Intumeſcency; conſidering that their *Series's* are diſpoſed according to the Length of the Muſcle, (as may be ſeen in the aforemention'd Figure) ſo that the Contraction of the Muſcle is equal to the Contraction of the Fibrils.

Now it being altogether conſonant to the conſtant Courſe or Cuſtom obſerved by Nature, to make Uſe of the ſhorteſt Way in her Operations, 'tis very probable alſo, that the Contraction of a Muſcle is performed rather by the Contraction of the Fibrils, than that of the Fibres.

Add to this, that the Fibrils being very ſmall and very ſhort, their Contraction, even to one half, will ſcarce be remarkable; for ſince all theſe Fibrils ſuffer a Contraction at once, it happens in the ſame Manner as if the Carneous Fibres were extended according to the Length of the Muſcle, and were forc'd together into many Corrugations, which Contraction of theirs, tho' very conſiderable in it ſelf, might be made without any remarkable Intumeſcency of the Muſcle. Unto this I think I may add, that the Fibrils, when ſhorten'd, do draw and pull together the Carneous Fibres, ſo that it is moſt probable that the Contraction of the Muſcle is performed by them; conſidering eſpecially, that when a Muſcle is contracted, it is drawn very remarkably together, and becomes ha which I don't ſee how it can be effected by a other Way, than by the Contraction of t Fibrils. But concerning the Conſtriction a contracted Muſcle, we ſhall have Occaſi to ſpeak more at large hereafter.

Beſides, it is the conſtant Cuſtom of Na ture to accompliſh her Operations by th leaſt Means that can be, ſo that the Fibr ſeem to be too thick and rude for the chi Contraction of the Muſcle, and were de ſigned and ſerve rather for the Paſſage o the Blood, than the Animal Motions, as ſha be ſhewn hereafter.

Unto this may be referred alſo, that th Shortneſs, as well as the almoſt infini Number of the Fibrils, does not a litt conduce to the Strength of the Muſcle i ſelf, and to the performing of their Tracti with the greater Force.

To be ſhort, whether we conſider th Number, Size, or Situation, of the Fibril 'tis evident, that they are much better adap ted for the Performance of the Muſcula Contraction, than the Carneous Fibres: An this is further confirmed by *Autopſy* it ſelf for as far as ever I have been able to mak my Obſervations upon the Inſpections i the Diſſections of living Animals, the Car neous Fibres do in the Contraction of th Muſcle draw nearer to one another no other wiſe than if they were attracted by th tranſverſe Fibrils, that they are not ſhorten'd themſelves, but ſeem to follow only th Contraction of the Fibrils.

What concerns the Ligature made at both Extremities of the Carneous Fibres, where upon the Muſcular Contraction does ceaſe, and the Fibre does not, as it uſed to do, ri into a Tumefaction, as it has been obſerve by Dr. *Willis*: This I ſuppoſe to happe thus, becauſe the Motion of the Blood and of the Animal Spirits is interrupted by thes Ligatures, the Influx of which is neceſſary towards the performing of the Contraction of the Fibrils.

CHAP. III.

the Particles by Means of which the Muſcular Contraction is accompliſhed; nd firſt of all of the moving Particles which are ſupply'd by the Blood, and ccaſionally of the Structure and Uſe of the Muſcular Fleſhy Part.

the preceding Chapter, I did endeavour o ſhew that the Muſcular Contraction chiefly performed by Means of the Fi-s, ſo that we muſt now next of all en-nto an Examination of the Cauſe which luces this Contraction of the Fibrils. It eyond all Diſpute, that the Influx of the mal Spirits is abſolutely neceſſary to the orming of the Function of Motion; s much as we ſee, that when a Nerve is ructed or cut off, the Muſcle into which Nerve is diſtributed, can't perform its traction. But notwithſtanding this, no rence is to be drawn from thence, that Contraction of the Muſcles does depend gether on the Animal Spirits, ſince there alſo other Particles required, carried thi-from the ſanguineous Maſs, to accom-h theſe Functions.

or it being evident, that the Arterial od does flow to the Muſcles with a full more plentiful Stream than to the other s, and that in a greater Quantity than t is required for Nutrition, eſpecially in more violent Motions, we may reaſona-conclude, that the Arterial Blood does ts Paſſage depoſite its Share, as much as quired or neceſſary towards the perform-of the Contraction of the Muſcles. Be-s that, the Structure of the Muſcles is , that they draw themſelves together in r Contraction, and by that Means do ve-much promote the Motion of the Blood; ch is the Reaſon why, when we run faſt, find our Blood to be put into a quick ion.

f this you may make a very eaſy Expe-nt in the Veneſection of the Median , which being open'd, if you contract Muſcles that are annex'd to the Cubit, ich may be done by making a Con-ion there with the inflected Fingers of your Hand) you will ſee the Blood which is expreſs'd from the ſaid Muſcles by this Contraction, ruſh out with much Impetuoſity from the Vein: And this Acceleration of the Motion of the Blood in the contracted Muſcles ſeems not to be the Effect of Chance, but of a peculiar Contrivance of Nature, *viz.* that ſo the moving Particles of the Blood may be ſupplied from thence to the Parts that are to be moved, and after theſe are ſeparated, the remaining Part of the Blood may by the Conſtriction of the abbreviated Muſcle be expel'd as it were with a Propulſation, in order to enable it, after it has been provided with a new Supply, to make good what was ſpent before, it may be return'd thither provided with a freſh Supply or Stock of theſe moving Particles.

What we have ſaid *juſt* now, is further confirmed by another Experiment made by the Ingenious *Steno*; for according to his Obſervation, it is obvious, that a Muſcle can't be contracted, in caſe a Ligature be made in the Artery which is diſtributed into it, ſo that the Afflux of the Blood into the ſaid Muſcle be intercepted by the before-mention'd Ligature.

According to my Sentiment, the main Uſe of the Muſcular Fleſh is to ſeparate certain Particles from the ſanguineous Maſs, ſuch as are neceſſary for the Contraction of the Muſcles: For it is obſervable, that it is the proper Function of all Sorts of the *Parenchymata* to ſeparate ſome Particles of a peculiar Kind from the Maſs of Blood by way of Percolation, as is manifeſt in the *Parenchyma* of the Liver, of the Kidneys, and others of the ſame Sort; and therefore it is very probable, that the *Parenchyma* of the fleſhy Part which is annex'd to all the Muſcles, is contrived and made for the ſame Purpoſe, *viz.* to ſeparate by Percolation a certain

certain Kind of Particles, ſuch as are neceſſary to the performing of the Contraction of the Muſcles.

The better to diſcover the Structure and Uſe of the Muſcular Fleſh, let us examine a little in what Manner the Blood takes its Paſſage through the fleſhy Parts.

I can't agree in Opinion with thoſe that maintain an Extravaſation of the Blood. They alledge in Behalf of this Opinion, that there would be no ſuch Thing as Nutrition of the Parts, in caſe the Blood undetain'd cloſe within its proper Veſſels; for (ſay they) how can a Rivulet render the adjacent Meadows fertile, unleſs it overflows its Banks ſo as to leave its Particles that are to render them fertile behind it. But this ſuppoſed Extravaſation of the Blood ſeems to be a Thing ſo confuſed, that there is but little Reaſon to believe or imagine, how the ſame ſhould take Place in that moſt exquiſite Fabrick of the Animal Body, where every Thing is framed with a moſt ſtupendious Contrivance and due Order.

Neither can I conceive in any Way, how the extravaſated Blood ſhould penetrate the very minute Orifices or Apertures of the Veins; for if the extravaſated Blood be ſuppoſed to be diffuſed through the whole Body or Subſtance of the Muſcle, it ſeems as if the Extremities of the Arteries and Veins muſt ſuffer a Compreſſion from the circumambient Blood, ſo that the Blood would not be able to enter the Orifices of the Veins thus cloſed up by this Compreſſion. Beſides, that there is no ſuch Thing as an extravaſated Blood in the Muſcles, is manifeſt from thence, that the Blood which is carried to a Muſcle where a Wound is given, does not break forth all at once, which muſt of Neceſſity happen, in caſe the extravaſated Blood were diffuſed through the Subſtance of the Muſcle.

In reference therefore to the Paſſage of the Blood thro' the Muſcles, we may rationally conclude, that the Capillary Arteries and Veins are conjoin'd together by certain Veſſels of different Kinds, ſo that there is one continued Duct or Communication betwixt them. 'Tis my Opinion, that the Extremities of the Arteries do terminate in ſome peculiar Veſſels, which immediately from their Beginning are propagated into certain Ducts, or rather infinite Membranous Veſicles, conjoined together by various *Anaſtomoſes* or Inoſculations; and that the Propagations of theſe Veſicular Bodies being conjoin'd at laſt in one Duct or Channel, do terminate in the open Orifices of the Veins, ſo that the ſanguineous Maſs being thus carried through ſo many Windings and Tortuoſities, bares ſome Reſemblance to an Extravaſation. 'Tis alſo very probable, that theſe Ducts, or Collections of the Veſicular Bodies, are extant in each Fibre in particular; for in the Diſſections of living Creatures, it has been obſerv'd, that we may make a Section in the Interſtices of the Fibres without any Appearance of Blood; whereas we ſee in the ſlighteſt Wound made in any of the Carneous Fibres, the Blood follows immediately.

'Tis further to be ſuppoſed, that this Collection of the ſanguiferous Veſicular Bodies does make up the main Part of the Muſcular Fleſh; for as to what concerns the ruddy moſt ſubſtantial Part, it ſeems to be nothing elſe but an Affuſion of the Blood which being coagulated, adheres and grows into thoſe Veſicles; for whilſt the ſanguineous Maſs does take its Paſſage thro' the *Mæanders*, and that with an even and eaſy Courſe, the thicker Particles, which are ſomewhat ſlower in their Motion, are ſeparated, and adhere or grow to the Sides of the *Veſiculæ*, which at other times, *viz.* when the Blood runs with a more rapid and impetuous Courſe, are carried along with it. Whence it is, that in Burning Fevers, as alſo in frequent and violent Exerciſes, the Muſcular Parts being bereaved of theſe, the Body becomes emaciated by Degrees.

As to the Uſe of the *Parenchyma Carnoſum*, it is very probable, that the ſaid *Veſicula*, together with the thick Part of the Blood that adheres to them, are inſtead of ſo many *Colatoria* or Sives, through which the more fluid Parts of the ſanguineous Maſs are ſeparated by Percolation, as has been intimated before.

Add to this, that the *Parenchyma* of the Fleſh being turgid with Blood, does ſuffer a Compreſſion by the Conſtriction of the contracted Muſcle, and the natural Subſidency of the Parts; whence it is, that the more fluid Particles, as it were by a ſtrong Expreſſion, are forced into the Parts to be moved, to perform the Functions of Motion.

C

Concerning the Nature of the moving Particles that are ſeparated from the Maſs of Blood, it is our Opinion, that they are of a *ſaline* and *ſulphureous* Nature; for I believe, that the ſulphureous and ſaline Particles being, by their continual Fermentation in the ſanguineous Maſs (as repreſented by us in another Place) raiſed to the higheſt Degree of Volatility, and intricated within one another, are ſeparated from the Blood by the Help of the Muſcular *Parenchyma*, and diſcharged into the Parts that are to be moved, in order to their Contraction.

For it muſt be obſerved, that when we uſe violent Exerciſes, we ſhall be ſenſible of the Loſs of a conſiderable Part of Fat, and that by continual Labours and Exerciſe it will be quite loſt; whereas on the contrary, ſuch Animals as are idle, and not employ'd in hard laborious Exerciſes, will grow fat apace, ſo that the Fat will adhere or grow to their Muſcles very plentifully.

Hence it is, that we may rationally conclude, that the ſulphureous Particles of the Blood, of which the Fat does conſiſt, do alſo bear their Share in the performing of the Contraction of the Muſcles, ſince thoſe Animals that are emaciated by continual Labour, ſeem to loſe their Fat for no other Reaſon but becauſe the ſulphureous Parts of the Blood, or the Fat, are ſpent and conſumed in the Muſcular Contractions; whereas when the Parts to be moved have ceaſed for a long Time from being contracted, the ſulphureous Particles are not conſumed in the Contraction of the Fibrils, but by the Means of their proper Veſſels, are carried to their peculiar Receptacles, all which, if carried thither in a ſufficient Quantity, make or form what we call the *Fat*.

But that the adipous Particles are convey'd by ſome peculiar Veſſels, is apparent from thence, that the ſanguiferous Veſſels that are diſperſed through the Body or Subſtance of the Muſcle, don't reach ſo far as to the Fat, which moſt commonly adheres to all the Muſcles; ſo that theſe ſulphureous Particles whereof the Fat does conſiſt, cannot proceed immediately from the Blood, but they muſt of Neceſſity be carried thither from the interior Part of the Muſcle by ſome peculiar Veſſels. Beſides that, it is evident from Anatomical Obſervations, that there lie certain Membranous Veſſels diſperſed here and there through the Subſtance of the Fat, which do reach or are propagated to the interior Parts of the Muſcles.

The Fat being thus laid up in its proper Repoſitories or Receptacles, though it in all Probability does not return towards the Parts that are moved, muſt nevertheleſs not be look'd upon in the leaſt as an uſeleſs Excrement, but is ſubſervient to various Uſes, as to ſupport the tender, and to lubricate ſome other Parts. But of this we ſhall have Occaſion to ſpeak more at large hereafter, it being now Time we ſhould enter into an Inquiry alſo of the Nature of the Animal Spirits, the Influx of which is alſo required in order to perform the Contraction of the Muſcles.

CHAP. IV.

That the Animal Spirits by which the Contraction of the Muſcles is performed, do conſiſt of nitro-aerious Particles; Occaſionally of the Motion of the Brain.

IN relation to the Animal Spirits, and their Nature, we may probably conclude, that they, as far as they conduce to the Animal Motion, do conſiſt of a nitro-aerious Spirit.

To clear this Point the better, we ſuppoſe above all Things, that the nitro-aerious Particles, which we have ſhewn you in another Place to be convey'd into the Blood by Inſpiration, do alſo bear their Share in the performing of the Function of Motion; which Opinion we have aſſerted before.

For in our Treatiſe of Reſpiration, we have long ago made this Obſervation, that the Animals in their violent Exerciſes, as for Inſtance when they run very faſt, are oblig'd

to ſtretch or ſtrain their Reſpiration to the utmoſt; which ſeems to happen thus; becauſe in theſe violent Motions the nitro-aerious Particles are ſeparated and conſumed in and for the Contractions of the Muſcles, ſo that of Neceſſity we muſt fetch our Breath oftner, that ſo the Blood may obtain a freſh Supply for what it has loſt, I mean, of thoſe nitro-aerious Particles which are required for the performing of the Functions of Motion.

For we don't make more reiterated Reſpirations in theſe violent Exerciſes, becauſe the Blood ſhould flow in a greater Quantity to the *Præcordia*; and being puſh'd forward by the more frequent Subſidency of the Lungs, may paſs thro' them with the more Facility; for we ſee, that in Fevers, when the Blood is hurried on with a very rapid Current, that the Reſpiration is not more intenſe than otherwiſe; and that the Blood may continue its Paſſage through the Lungs, notwithſtanding their Motion is ceaſed, has been ſhewn in another Place.

It would be in vain to ſay, that in violent Exerciſes the Reſpiration is often reiterated to cool the over-heated Blood; for thence it would follow by a natural Conſequence, that in Fevers, where the Blood is as it were in a Flame, there would be a Neceſſity alſo for a more frequent Reſpiration. Beſides that, the Air which is inſpired does conduce rather to augment than to allay the Heat of the Blood, as has been ſhewn before; ſo that to ſpeak more properly, the Blood, by Means of the Contraction of the Muſcles, cauſed by the violent and frequent Motions, is rather deprived of its fermentative Particles, and apt to incline to a Coagulation; and that upon that Account there is a Neceſſity for a more frequent Reſpiration, to wit, that by this Means the leſſer Expence of the fermentative Particles being made good, the true Fermentation of the Blood be maintained: From whence it follows, that the nitro-aerious Particles, on which the Fermentation of the Blood does depend, which are ſeparated from the Maſs of Blood in violent Motions, are ſpent and loſt in the Contractions of the Muſcles.

From what has been ſaid, we conclude, that the *nitro-aerious* Particles are neceſſary towards the performing of the Contraction of the Muſcles; as will appear more evidently from what follows.

I think it ought to be taken for granted, that the Motion of the Muſcles is accompliſhed by Means of the Particles of different Kinds being intermix'd together; for I cannot conceive by what other Ways or Means the Animal Motion can be perform'd: For as to what relates to the *Elator* and the *Pondus*, by Means of which, Machines uſed to be ſet in Motion, neither of theſe can take Place in the Fabrick of the Humane Parts, foraſmuch as their Force ſoon ceaſes. It ſeems therefore more conſonant to Reaſon, that the Function of Motion is performed by the Means of Particles of different Kinds, which being intermix'd according to the Will and Pleaſure of the Soul, do raiſe one another into a very quick and mutual Exagitation. In Confirmation of which Opinion we may add, that, in order to the accompliſhing of this Contraction of the Muſcles, we do not only ſtand in Need of the Animal Spirits carried thither by the Nerves from the Brain, but alſo of the Aid of ſome other Particles ſupply'd by the Blood; as has been intimated before.

Now let us therefore ſee what Nature theſe Particles are of by which the Muſcular Motion is accompliſhed.

In reference to this Point, the moſt common Opinion is, that the Motion of the Muſcles does depend on the Salts of different Kinds, intermix'd together, and raiſed into a mutual Effervеſcency in the Parts that are to be moved. But to raiſe ſuch an Effervеſcency, it is requiſite, that one of theſe Salts ſhould be an Acid, and the other of a pure ſaline Nature; whether it be fix'd or volatile, matters not. But it ſeems very probable, that there is no ſuch Thing as an Acid in the ſanguineous Maſs, unleſs it be in a morbifick State; for the Blood, whilſt in a Diſpoſition of Health, is not impregnated with any other but a volatile Salt, or at leaſt an acid, a ſaline, or *armoniack* Salt.

Neither is there any Reaſon to believe that the acid Salt ſhould have any Share in moving the Parts that are to be moved, the Acids being Enemies to the tender and nice Structure of the Fibrils, which are much impaired whenever any acid Liquor is poured upon them.

Be-

Beſides this, in caſe we ſuppoſe two ſuch alts of a contrary Nature, be they elſe hat they will, to come from the Maſs of lood, how comes it to paſs, that theſe, hilſt intermix'd in the Blood, do not act pon and deſtroy one another, as it is obrvable in the Salts of a contrary Nature? dd to this, that ſuch an Effervescency of he contrary Salts has no Relation to the arts that are to be moved; becauſe Salts of contrary Nature, whenever mix'd together, re never united without a Coagulation, hich Coagulation cannot be admittted to ake Place in the moſt minute Structure of he Fibrils. Neither muſt we paſs by in Sience here, that an Effervescency rais'd by he Conflict of Salts of a contrary Nature is nade very ſlow, and of ſome Continuance, nd therefore not at all ſuitable to the momentaneous Contractions of the Muſcles, as has been intimated above.

For to accompliſh the Contraction of the Muſcles, the Agitation of the elaſtick Parcicles muſt be ſuch as may be performed in Moment's Time, without any Coagulaion: And I much queſtion, whether there e any other ſuch like Fermentation in Naure, beſides that only Effervescency of the itro-aerious and ſalino-ſulphureous Partiles, which are apt, according to their naural Diſpoſition, to ſet one another into a ery quick Motion.

'Tis therefore in this Effervescency we uſt look for the Contraction of the Muſcles; for ſince the other moving Particles re of a ſulphureo-ſaline Nature, as I have ndeavoured to ſhew before, 'tis requiſite hat the other moving Particles ſhould be of nitro-aerious Nature, theſe being only qualified for the putting of the ſalino-ſulphureous Particles into an Agitation.

That the nitro-aerious and ſulphureous Particles, when mix'd together, will go into an Effervescency together, I hope, is evident from what has been ſaid upon that Point in another Place; unto which we may here add this following Experiment: *viz.*

Mix ſome Spirit of Wine highly rectified, with ſome Spirit of Nitre clear'd from all its Phlegm as it ought to be, and you will immediately ſee them go into a ſtrong Effervescency, eſpecially if they be placed near a warm Place: The Reaſon of which ſeems to be, that the nitro-aerious Particles, wherewith the Spirit of Nitre does abound, (as has been ſhewn in another Place) and the moſt volatile ſalino-ſulphureous Particles, whereof the Spirit of Wine does conſiſt, do raiſe themſelves (according to their Natures) into a mutual Agitation. Neither is there any Reaſon to aſſert, that the Spirit of Nitre, in reference to its ſaline and acid Part, has any Contrariety to the ſulphureous Particles of the Wine.

For as the nitro-aerious Spirit entring into a Conflict with the Sulphur of the Earth, does raiſe that Fermentation in which the Motion and Life of all the Vegetables does conſiſt; and in the ſame Manner likewiſe as the ſame Spirit, when convey'd into the Maſs of Blood by the Help of Reſpiration, and there going into an Effervescency with the ſalino-ſulphureous Particles of the Blood, does produce the vital Heat and Motion, as I have endeavour'd to ſhew in another Place; ſo it is very probable, that the Animal Life likewiſe, and the Function of Motion, owes its Riſe to the ſame Particles, when more exalted, and raiſed to their higheſt Pitch of Vigour: For, according to the Notion I have of this Matter, the nitro-aerious Particles which make their Irruptions from the Brain into the Parts that are to be moved, meeting there with the ſalino-ſulphureous Particles, go into an Effervescency, by which mutual Agitation the Contraction of the Muſcles is performed in the ſame Manner as has been ſaid before.

Hence it is, that for the Continuation of the Animal Motion, it is abſolutely neceſſary that there be always at Hand a conſtant Supply of ſalino-ſulphureous and of nitro-aerious Particles in the Maſs of Blood; and the more intenſe this Contraction of the Muſcles is, as in hard Labours, and in violent Exerciſes, the more is this Stock of the ſalino-ſulphureous and nitro-aerious Particles exhauſted; to make good which Loſs, Reſpiration was not only deſigned, but alſo the Body is to be refreſh'd and ſupply'd with a good Quantity of ſuch Aliments as abound in ſalino-ſulphureous Particles: Whence it is, that all ſuch Things as conſiſt of a conſiderable Quantity of volatile Salt and Sul-

phur, are before all others proper to reſtore thoſe that have ſpent their Vigour and Strength by continued Labours.

From what has been ſaid, we may account for that intenſe Heat which is obſerved in the moving Parts in violent Exerciſes. This Incaleſcency is commonly attributed to the Motion of the Body it ſelf; but in the Motion of Animals, there is not ſuch an Attrition of their Members (whence this Heat only can ariſe) as is able to produce ſuch an intenſe Heat.

'Tis therefore moſt probable to believe, that the Heat in the Muſcles, when they are much contracted, does owe its Cauſe to the nitro-aerious Particles, which are put into a violent Agitation in them at that Time; for that all Heat is produced from the Agitation of them, I have endeavoured to prove in another Place.

And here I cannot but take Notice by the by, that the Ancients were not altogether in the wrong, when they aſſerted, that the Head Spring of the vital Heat was in the Heart; not that we muſt imagine, that there is ſomething, I know not what, like a Lamp or Flame always burning within its ſacred Receſſes; but conſidering that the Heart is always in Exerciſe to the Continuation of the Motion of the Blood, the nitro-aerious and ſulphureous Particles do without Intermiſſion continue their alternative Effervеſcencies in its muſcular Part, and theſe being put in Motion, this muſt of Neceſſity produce a conſiderable Heat.

Beſides that, from the before-ſaid *Hypotheſis* we may account for another *Phænomenon*, *viz.* why the Sweat that is ſent forth in violent Motions, is of a ſaline and a very penetrating Nature; *viz.* the moſt ſubtile nitro-aerious Particles, as well as the ſalino-ſulphureous, from the Intermixture of which the Contraction of the Muſcles does depend, being forced outward together with the *Serum*, do render it very aerious and penetrant. But the Reaſon why the Sweat is acid and ſalt, ſeems to be, becauſe the volatile Salts of the Blood being intimately united with the ſulphureous Particles, are by the Effervеſcency made in the Contraction of the Muſcles (in the ſame Manner as has been deſcribed before) for ſome Part of them diſſolved.

From what has been ſaid hitherto, it is in ſome Meaſure evident, that the muſcular Motion does depend on the nitro-aerious Particles, as well as the nitro-ſulphureous, which put one another in an Agitation within the Parts that are to be moved.

But among theſe Particles, by Means of which the muſcular Contraction is performed, ſome, *viz.* the Animal Spirits, are carried from the Brain through the Ducts of the Nerves into the Parts that are to be moved; and ſome others are ſupply'd from the Maſs of Blood, as has been ſhewn before.

We muſt therefore in the next Place examine, Whether the nitro-aerious Particles do conſtitute the moving Particles that are ſupply'd from the Blood, or the others which come from the Brain, *i. e.* the Animal Spirits? Concerning this Queſtion, I was for ſome Time in Suſpence, whether the nitro-aerious Particles were not immediately convey'd from the Maſs of Blood to the Parts that are to be moved: But upon a more ſerious Conſideration, it ſeem'd moſt probable to me, that the moving Particles ſupply'd from the Blood were of a ſalino-ſulphureous Nature, as may be ſeen in ſome Meaſure by what has been ſaid above; ſo that by a natural Conſequence the nitro-aerious Particles do proceed from the Brain, and conſequently are the Animal Spirits themſelves. It is certainly much more probable, that a nitro-aerious Spirit, than that the ſalino-ſulphureous Particles, ſhould have their Riſe from the Brain; for there is no ſuch Thing as any ſulphureous Particles to be ſeen in the Brain, whereas they are found every where diſpoſed thro' the Subſtance of the Body of the Muſcle.

Beſides that, all ſulphureous Things ſeem to be Enemies to the Animal Spirits; for all the Liquids that abound with volatile Sulphurs, as the Spirit of Wine, and the Oils of Vegetables extracted according to the Chymical Art, if applied too haſtily, create a Diſturbance in the Brain and in the Animal Spirits; nay, ſometimes will produce a Giddineſs, and even a Phrenzy, and convulſive Motions; whereas on the contrary, the whole Structure of the Brain ſeems to be ſuch as is very commodious and proper for the Separation of the nitro-aerious Spi-

irits from the Maſs of Blood, and to pre-
ve it as ſuch, as will be ſhewn more
large hereafter.

In reference to the Nature of the Animal
irits, I muſt confeſs the Authority of the
arned Dr. *Willis* did not a little incline my
pinion, at firſt to agree with him when he
ys that the Animal Spirits do obtain the
ature of a volatile Salt; for theſe are his
ords in the 11th Chap. of his Treatiſe of
e Diſtempers of the Brains. 'The Ani-
mal Spirits in their natural and healthy
Diſpoſitions ſeem in ſome Meaſure to be
not unlike a Spirituous Liquour, abound-
ing in a volatile Salt, which is diſtill'd
from the Blood.

But upon better Conſiderations found,
hat ſince the muſcular Contraction is per-
ormed by Particles of different Kinds mix'd
ogether, (according to the Sentiment of the
id ingenious Perſon himſelf, and according
s it ſeems moſt conſonant to Reaſon,) if
he Animal Spirits did conſiſt of a volatile
alt, then the other moving Particles which
re ſupply'd from the Blood, muſt of Ne-
eſſity conſiſt of an acid Salt; without
which the Animal Spirits when they meet
ogether would not go into an Effervescency
with them; but there ſeems to be but little
or rather no Reaſon at all to imagine, that
ny Place can be allow'd for an acid Salt in
healthy Diſpoſition of the Body, and
much leſs in thoſe Parts of it that are to be
moved, as has been ſhewn before.

And ſuppoſing that there is ſuch an acid
Liquid exiſtent in the Fibres, How can it
come to paſs that the Animal Spirits
ſhould go into an Effervescency with them,
conſidering that theſe Spirits themſelves do
ſometimes turn into an acid Humour? as it
happens in the Mellancholy Madneſs, accor-
ning to the Learned Doctor's own Opinion.

'Tis for theſe Reaſons that it is much
more probable to imagine, that the Animal
Spirits do conſiſt of nitro-aerious Particles,
which, according to the Directions of the
Soul or Mind, making an Irruption into the
Parts that are to be moved, and meeting
there with the Salino-ſulphureous Particles,
by their unuſual Agitation, according to
their Nature, the Contraction of the Fibrils
is accompliſhed in the ſame Manner as has
been ſaid before.

'Tis my Opinion, that the Animal Spirits
are of ſuch a Nature, as not to be ſubject to
any Mutation or Change, and that as to
thoſe Diſeaſes which are commonly attribu-
ted to their vitious Diſpoſition, I believe
thoſe few proceed either from the Interrup-
tion of the *Tenor* of the Animal Spirits, or
elſe from their inordinate Motions; as will
be ſhewn more at large hereafter.

The nitro-aerious Particles ſeem to ap-
proach neareſt to the Nature of the Animal
Spirits, as being very ſubtle, of a quick
Motion, and endued with an elaſtick Virtue;
for the nitro-aerious Particles are very apt to
go into a very quick Motion almoſt like the
Fire, as has been ſhewn in another Place.
The Animal Spirits are the ſame which pene-
trate the Filaments of the Nerves in an
Inſtant, tho' not provided with any viſible
Cavities; and being at laſt carried to the
Muſcles, do by quick Motions produce their
momentaneous Contractions.

Furthermore, the Animal Spirits, like the
nitro-aerious Particles, are ſo thin and ſubtil,
that they are immediately diſſipated, without
as much as leaving any Tract behind them:
Unto which may be added, that the nitro-
aerious Particles are no leſs neceſſary towards
the Preſervation of Life than the Animal
Spirits.

It would certainly be a very difficult
Matter to conceive, why all Animals ſhould
be under ſo abſolute a Neceſſity of Inſpiration
of the Air, that they can't even ſubſiſt as
much as one Moment without it, were it
not that the nitro-aerious Spirits, which are
in Effect the Animal Spirits themſelves, did
bear the principal Share in the Support of the
Animal Life. Hence it is, that, according as
there is Occaſion for a greater, as in violent
Motions, or of a leſs Quantity, as in the
State of Quiet of the Body, of the Animal
Spirits, there is required alſo either a larger
or a leſs Supply of the nitro-aerious Particles;
which is the Reaſon why in violent Motions
Reſpiration is ſo much increaſed.

Let us, I beg you, conſider beſides all this,
from whence it is, that we can promiſe our
ſelves a ſufficient Stock or Supply of the
Animal Spirits for thoſe that exhauſt their
Strength by continual Labours, were it not
for that inexhauſtable Spring, I mean the
Air, which muſt be call'd to our Aid, and to
ſupply

ſupply all the Deficiencies; for it ſeems more than probable, that there is a much greater Quantity of the Animal Spirits conſumed in the Muſcular Contraction, than what is generally believed: For it is impoſſible to conceive, how a Muſcle ſhould be able to contract it ſelf with ſo exceſſive a Force, were it not that the elaſtick Particles did concur in a very great Quantity to this Contraction: Whence it is, that when we are upon any violent Exerciſes, we draw our Breath with more Strength, *viz.* to make good that exceſſive Loſs of the Animal Spirits ſuſtained during the Endeavours that are made in ſuch-like violent Motions.

Nay, it ſeems as if there were a very conſiderable Quantity of Animal Spirits required, not only to maintain the Motion of the Muſcles, but alſo for the Support of Life, it being very probable, that Life cannot be ſupported without a conſtant Concatenation, and as it were a Current, of the Animal Spirits, which paſs through the Brain, or at leaſt through the *Cerebellum*; which is the Reaſon, that whenever the Reſpiration or the Motion of the Heart or Blood is interrupted only for one Moment, the Animal dies in an Inſtant. But of this more hereafter.

For the better Confirmation of what has been ſaid before, may be added what has been obſerved by the Learned *Malpighius* in relation to the Reſpiration of Inſects; for he has made this Obſervation, That *thoſe blackiſh Spots* which are to be obſerved on both Sides of the Spine in the Inſects, are ſo many Windpipes or *Tracheæ* through which Inſects draw in the Air; for ſo ſoon as theſe Windpipes are beſmeared with Oil, the Inſect dies in an Inſtant, becauſe its Reſpiration is intercepted. The ſaid great Man has further obſerved, that certain Twigs of the aforeſaid *Tracheæ* are inſerted here and there within the Spinal Marrow.

But to accommodate this to the Point in Queſtion, it cannot be denied, but that the Animal Spirits, in thoſe Animals that are reckon'd among the perfect ones, are elaborated no where elſe but in the Brain, and that from thence, as from the Head Spring, they are derived and diſſeminated to the Spinal Marrow, and to thoſe Nerves that have their Riſe there; whence it is, that when the Head of ſuch an Animal is cut off, the Influx of the Animal Spirits into the Spinal Marrow is quite intercepted, and conſequently the Parts of the decollated Body does drop immediately without any Motion.

But in thoſe Creatures that are leſs perfect, as in Inſects, which, if cut aſunder, will continue to live, the Animal Spirits are elaborated chiefly and immediately, and laid up, like in their proper Reſervatories, not only in the Brain, but alſo in the Protuberancies of the Spinal Marrow, like as into ſo many *Cerebelli*, which are placed all along the Length of the ſaid Spinal Marrow: whence it is, that though theſe Inſects are cut into Pieces, the Animal Spirits are ſtill ſupplied to that Part of the Spinal Marrow that remains entire, which therefore for ſome Time after continues its Motion and Life.

But that the Animal Spirits may be convey'd into the Spinal Marrow of the Inſects, it was abſolutely neceſſary, that certain Windholes or *Bronchiæ* ſhould be propagated into them, as actually they are, that ſo the nitro-aerious Particles of which the Animal Spirits do conſiſt, may by their Means be carried into the Spinal Marrow. Hence it is, that when ſome of theſe aforeſaid Windholes or Pipes are beſmeared with Oil, the adjacent Parts being thereby deprived of their conſtant Supply of the nitro-aerious Particles, and of the Animal Spirits, do immediately grow paralitick, whilſt the other Parts continue well.

But in the more perfect Animals, the nitro-aerious Particles are only convey'd into the Blood by Means of the Lungs, and after that, by the Pulſation of the Heart, and the Supply of the Blood that goes to the Brain, are from its *Appendix* convey'd to the Spinal Marrow; ſo that we ſee, when the *Trachea Arteria* is ſtop'd up, ſo that the Inſpiration is intercepted, or that the Motion of the Heart or of the Blood is ſuppreſs'd, or elſe if the Brain be under an ill Diſpoſition, and conſequently the nitro-aerious Particles deſigned for the Elaboration of the Animal Spirits are not carried to the Brain, the Animal dies immediately.

From whence it ſeems in ſome Meaſure to be apparent, (according to my Opinion) that the nitro-aerious Particles, which, by the Help

lp of Reſpiration, are transfer'd into the ſs of Blood, and thence to the Brain, are Animal Spirits themſelves. Unto this y be added, that if you put a living ature into a Glaſs, out of which the Air been drawn by Mr. *Boyle*'s Air Pump, it n a little Time after ſeiz'd with dreadful nvulſions; for the Animal Spirits being rived of their uſual and due Supply by withdrawing of the Air, do, according heir wonted Cuſtom, run into diſorder-Motions, and making tumultuary Irrup-ns upon the Nerves, produce theſe Con-ſions, till the Animal, for Want of Air Spirits, dies.

Unto this you may add alſo, that ſuch as affected with the *Engliſh* Conſumption, w very weak, and are almoſt quite deſti-e of Animal Spirits; the Reaſon of which ns to be no other, than that their Lungs ng conſumptive and flaccid, the nitro-ous Spirit is not in a ſufficient Quantity ied into the Maſs of Blood to produce Animal Spirits.

Neither muſt we forget in this Place to erve, that in peſtilential Diſeaſes the in is chiefly affected, and the Oeconomy he Animal Spirits moſt of all diſturbed; conſidering that when the Plague does e its dreadful Havock far and near, the o-aerious Spirit takes the venemous In-ion, and conſequently the Animal Spi-which are made by it, muſt alſo of Ne-ty be affected with a venemous Diſpo-on.

eſides that, the nitro-aerious Particles the moſt proper for the making of the mal Spirits; for this is the Nature of its, that ſometimes they will be as it e idle and unactive, but on the contrary, ther times extremely active and nimble. he ſame Manner the nitro-aerious Spirit to be in a different State; for ſome-s it is very quiet, but at other times moſt e, and moving with great Agility: For never the nitro-aerious Spirit is inter-d with the ſulphureous Particles, it es with a moſt ſwift Motion, almoſt the Fire; but when it is fed from theſe hureous Particles, it remains in a State Quiet, as has been ſhewn in another

is alſo very well worth our Obſerva-tion here, that the Nature of the Brain is ſuch, as is very proper, and adapted altogether, to collect and lay up the nitro-aerious Particles; becauſe the Brain, above all other Parts, is deſtitute of ſulphureous Particles, which are apt to put the nitro-aerious Spirit into an Agitation, and to ſubdue it; and as it is of a ſaline Nature, as we may call it, ſo it is the more proper and convenient for to detain the nitro-aerious Spirit.

From this *Hypotheſis* of ours, we may alſo deduce a probable Reaſon why the Animal Spirits are moſt affected by the Light beyond any other ſenſible Objects, and why they are put in Motion by it, and conſequently awaken the Animal; ſo that we ſee, there is a Neceſſity for the Animal to have its Eyes ſhut or cloſed when 'tis to ſleep, to keep out the Light; whereas in reſpect to the other Senſes, there is Admittance given to the Objects even when the Animal is aſleep.

To ſolve this *Phænomenon*, it is to be conſider'd, that the Light depends on the Motion of the nitro-aerious Particles diſſeminated thro' the Air, as I have endeavoured to prove in another Place. Now conſidering that Animal Spirits do conſiſt of nitro-aerious Particles, 'tis conſonant to Reaſon, that they are very apt to follow the Motion of the luminous Particles, they being of the ſame Kind with them: Whence probably it is alſo, that when a violent Stroak is given upon the Eye, it ſeems as if a Fire did break out before it.

'Tis very probable, that the nitro-aerious Particles, which are lodg'd in great Quantity in the Optick Nerves, are, by a violent Concuſſion made upon them, irritated into a Motion altogether like unto that which is requiſite to produce what we call *Light*. But whether certain Animals, as for Inſtance, the Cats, with the Help of their luminous Motion, are able to put alſo the nitro-aerious Spirits which are in the Eye in Motion, I will not pretend to determine, tho' it ſeems not improbable to be ſo, becauſe a Cat makes uſe of the Senſe of Sight even in the Night-time.

According to this *Hypotheſis* may be ſolv'd alſo another *Phænomenon*, *viz.* how it comes to paſs, that when an Animal is Thunder-ſtruck, it is often kill'd without any out-

ward

ward Tract or Sign of a Stroak given, or any other Hurt received. To clear this Point the better, we muſt repeat here what we have endeavoured to prove in another Place, *viz.* That the Thunder has its Riſe from thence, that the nitro-aerious Particles which are expanded throughout the whole Atmoſphere, are, by the violent Concuſſion of the Air, put into a luminous, and ſometimes into a fiery, Motion: And conſidering that the nitro-aerious Particles do conſtitute the Animal Spirits, it may happen ſometimes ſo, that thoſe that are in the Brain, follow the Motion of the thundering nitro-aerious Particles of the Air, ſo that the Animal Spirits may properly be ſaid rather to *thunder*, than to be *Thunder-ſtruck*: Whence it is, that the ſame Animal Spirits being put into a moſt violent Motion, and as it were ſet on Fire, are diſſipated in an Inſtant; ſo that by reaſon of the Light which is lighted in the Brain, the Animal being deprived of its natural Light and Spirit, dies. But of this more hereafter.

But we muſt not neglect to take Notice here, that the Animals are neceſſitated after violent Exerciſes to fetch their Breath very faſt for ſome Time; the Reaſon of which is, that the Blood returning from the Brain to the Heart, is for the moſt part deprived of its nitro-aerious Particles, theſe being ſeparated in the Brain and the *Cerebellum* to ſupply the Loſs of the Animal Spirits: Whence it is, that a conſiderable Part of the Blood, for Want of theſe nitro-aerious Particles, is deprived in ſome Meaſure of its due Fermentation, and inclinable to a Coagulation; for that the Fermentation and Motion of the Blood does depend on the nitro-aerious Particles, has been ſhewn in another Place, and been obſerved likewiſe by the Learned Dr. *Thruſton*.

So that in order to keep up the Fermentation and Fluidity of the ſanguineous Maſs, for ſome Time after a violent Motion is over, we ſtand in Need ever of more repeated and larger Reſpirations. Hence it is alſo apparent, why the Blood that is taken out of a Vein in convulſive Paroxyſms, is commonly very thick, and ſomewhat grumous.

For in the more violent Contraction of the Muſcles, there happens a conſiderable Loſs, not only of the nitro-aerious, but alſo of the ſalino-ſulphureous, Particles, (fro the mutual Conflict of which depends t Fermentation and Fluidity of the Blood and conſequently the Maſs of Blood muſt Neceſſity incline towards a Coagulation and this happens moſt frequently, when t Parts that are ſubſervient to Reſpiration, ſuffer Convulſions, becauſe there the Lo of the nitro-aerious Particles ſuſtained du ring the convulſive Motions, is not repaire by reaſon of the Reſpiration being almo ſuppreſs'd, as it is at other times after viole Motions, where it is made good by reite ted Reſpiration.

Againſt what has been ſaid hitherto, may probably be objected, That ſince t Animal Spirits do conſtitute the chief Pa of the Body, it is very probable upon th Account, that they don't derive their Or gine from the Air, which is an extraneo Thing, and foreign to the Body of the An mals, but rather from the moſt noble Par cles of the Blood, ſuch as are exalted to th higheſt Pitch of Subtility and Vigour; an that it ſeems not very ſuitable to that mo artificial and admirable Contrivance of t Machine of the Animal, to be beholdi for its Motion to an extraneous Principle.

Unto this it is anſwer'd, That let the An mal Spirits be of what Kind they will, 'i certain that they are ſupply'd from ou wards; for even ſuppoſing them to be el borated by the Blood, ſince the ſanguineo Maſs is renew'd by our daily Food, it mu of Neceſſity follow, that the Spirits, whic have their Riſe from them, owe their Or gine alſo to ſomething that is extraneou And what Reaſon therefore is there to a ledge upon that Account, that the Anim Spirits may not rather have their Riſe fro the Air, than from the Aliments that a taken inwardly? 'Tis certain, that the A is impregnated with very active and mo ſubtile Particles; and there is ſuch an abſ lute Neceſſity of drawing it by Inſpiratio into our Bodies, that we are not able much as to live one Moment without Beſides that, it ſeems that the great and co tinual Loſſes that are ſuſtained in the An mal Spirits, can't be repaired any other Wa than by the Air.

As to what is alledg'd concerning the a tificial Contrivance of the Machine of t Anim

nimal, it conſiſts in this, that the ſeveral rts of the Body are framed in ſo exact a mmetry, that moſt ſtupendious Effects are oduced there by vulgar Cauſes.

And here it is to be obſerved by the by, at when I make the nitro-aerious Particles e Animal Spirits, I would not be under-ood ſo, as if I did aſſert the nitro-aerious irit to be the ſenſitive Soul it ſelf; for it my Opinion, that the Soul is a Thing ve- different from the Animal Spirits, as con-ting of a Matter much more ſubtil and herious, but that the nitro-aerious Parti-es, *i. e.* the Animal Spirits, muſt be con-der'd as its chief Inſtrument.

For as to what relates to the ſenſitive Soul, cannot have any other Apprehenſion of it, an that it is a certain *Aura* or Breath par-cipating of a divine Nature, endued with Senſation from the firſt Creation that is rried all over the World; a ſmall Portion which being contained in a Subject in its atural Diſpoſition, does produce ſuch Fun-ions, as (to our great Admiration) we ſee ppen in the Bodies of Animals.

It is alſo my Opinion, that this ſpirituous latter being without any animated Body, oes neither feel, nor has any other Action, ut lies as it were dormant and idle, much fter the ſame Manner as it happens in e ſenſitive Soul when the Animal is faſt leep.

The Affiux of the Arterial Blood alone oes not ſeem ſufficient to carry a competent upply of nitro-aerious Spirits to the Brain; nd 'tis upon this Account that it ſeems ve- probable to me, that the thick *Meninx* Membrane which incloſes the Brain, has mething of a Pulſation belonging to it; o that by its Contraction, the Blood that carried thither is ſqueez'd or preſs'd out, well as the nitro-aerious Particles, which e preſs'd from the Blood into the Brain, moſt after the ſame Manner as the other oving Particles of the Muſcles are thruſt nto the Parts to be moved by their Con-riction.

That there is ſuch a Pulſation in the *Du-a Mater*, is confirm'd by Experience; for the Fractures of the Skull, when the rain does ſometimes appear, one may ſee it o riſe upwards, and ſoon after to ſubſide or ttle downwards, and ſo alternatively; ſo that it ſeems as if this Motion of the Brain did act according to that of the Pulſation of the Heart.

And truly, when I conſider the Thickneſs and Strength of the *Dura Mater*, as well as its nervous Fibres, I can't but conceive, that this Membrane, like the reſt, is deſign'd for ſome Motion. It ſeems very probable to me, that the *Dura Mater* is in the Nature of another *Diaphragm*, by the Means whereof the Brain does draw in, and in ſome Meaſure reſpire again, the nitro-aerious Spirits.

'Tis very probable that the Motion of the beforeſaid *Meninx* is natural, yet ſo as that it is in our Power either to increaſe or retard its Pulſation at Pleaſure, after the ſame Manner as we do in the Motion of the Parts belonging to Reſpiration: And it is alſo no leſs probable, that (according to its different Motions) there ariſe different Effects in the Animal Body; for, in Proportion as this Membrane does contract it ſelf either more or leſs, there is a greater or leſs Quantity of the nitro-aerious Particles, *i. e.* of the Animal Spirits, carried to the Brain, and from thence into the Nerves.

Hence it is, that whenever there is an extraordinary Quantity of Animal Spirits required for the performing of ſome extraordinary Function of Motion or of Senſation, we are obliged to draw the Head and Brain together, as every one may try in himſelf; and this Conſtriction of the Brain ſeems to proceed from the hard *Meninx* which contracts it ſelf. Certain it is, that when we are in a great Paſſion, *viz.* when we endeavour either to defend or revenge our ſelves, this Membrane is as it were put into a Convulſion, and ſeems to contract it ſelf as well as the Brain; whence it is, that the nitro-aerious Spirits being forced into the Brain, and thence into the Nerves, with great Impetuoſity, do produce certain involuntary Motions, and trembling Convulſions.

Unto this I may add, that it ſeems very probable that Sneezing is produced by the *Dura Mater* when it is ſtrongly contracted, and forces the Animal Spirits with Impetuoſity into the Nerves dedicated to Reſpiration; for it is obvious beyond Diſpute, that when we ſneeze, the Membranes of the Brain are chiefly affected.

Nay, I do almoſt ſuſpect, that the Pulſation of the Heart, as well as Reſpiration, both of which are performed alternatively, do depend on the Pulſation of the *Dura Meninx* that incloſes the *Cerebellum*.

It is alſo not improbable, that the Epilepſy, as well as the Apoplexy, do ſometimes owe their Origine either to a Convulſion or to a Palſey of the ſaid Membrane; becauſe in theſe Diſtempers, the Brain is moſt commonly found to be free from any vicious Indiſpoſition: In Confirmation of which it muſt be conſider'd alſo, that ſuch Things as abound in volatile Salts and Sulphurs, as the *Ol. Succini*, and ſuch like other Things, are very proficuous in the aforeſaid Diſeaſes.

Neither muſt we ſuppoſe, that the ſalino-ſulphureous Liquids do penetrate thro' the Brain it ſelf, and corroborate it; becauſe ſulphureous Remedies ſeem to be Enemies to the Brain, and if taken too frequently, will break into the innermoſt Receſſes of the Brain, and cauſe Convulſions there; as has been ſhewn in another Place. But the true Reaſon why theſe beforementioned Oils are proper and proficuous in theſe Diſeaſes, muſt be imagined to be this, becauſe they are apt and proper to corroborate the moving Parts and pervious Fibres; it having been found by Experience, that ſuch Things as conſiſt of volatile Salts and Sulphurs, are very proper and qualified to reſtore chiefly the true Tone of the Fibres of the Muſcles: Whence it is, that theſe Sorts of Medicaments are very beneficial to the Membranes of the Brains, not only when they are weaken'd, but even when they are almoſt torn aſunder, and conſequently are of excellent Uſe and Benefit in the beforeſaid Diſeaſes.

If I may be permitted to give you my further Conjectures concerning the Uſe and Function of the ſaid Membranes, it ſeems very probable to me, that Sleep owes its Origine to this, *viz.* that the Membranes which incloſe the Brain, but not the *Cerebellum*, do either quite ceaſe in their Motion, or at leaſt do move but very ſlightly; ſo that the nitro-aerious Particles being not carried to the Brain, the Animal Functions muſt of Neceſſity be interrupted.

And when we ſee the Animal, tired out with hard Labour, to be urged to a Neceſſity of ſleeping, this *Phænomenon* muſt not be accounted for thus; as if there was a Defect, or not a ſufficient Supply, of Animal Spirits, or of the nitro-aerious Particles, becauſe of theſe there is always an exhauſtible Stock in the Air; but rather, that the ſalino-ſulphureous Particles of the Blood are conſumed by Watching and Labour: And the Defect or Want of the ſalino-ſulphureous Particles does regard the Parts that are to be moved, and not the Brain, unleſs in ſo far as the *Meninges* of the Brain, which muſt be reckon'd among the Parts to be moved, cannot perform their Pulſations, if there be not a ſufficient Supply of ſalino-ſulphureous Particles in the Blood.

It is therefore my Opinion, that Sleep owes its Origine to this; that the ſalino-ſulphureous Particles are ſo far conſumed by hard Labours, Exerciſes, or Watching, that the *Meninges* of the Brain can't, by reaſon of the Want of them, perform their Motion; and this ſeems to be done by a peculiar Providence and Contrivance of Nature, *viz.* that ſince the ſalino-ſulphureous Particles of the Blood are almoſt exhauſted by Watching, the Remainder of theſe Particles ſhould be reſerved for ſuch natural Functions as are abſolutely neceſſary for the Support of Life.

Hence it was, that there was a Neceſſity for the Membrane that ſurrounds the Brain to ceaſe now and then from its Motion, that ſo the Reſidue of the moving Particles might be employ'd and beſtow'd upon the Motion of the Membrane that incloſes the *Cerebellum*, in order to perform the other natural Functions. And here it is very obſervable, that though whilſt we are aſleep, the ſpontaneous Animal Functions, which are performed with the Aſſiſtance of the Brain, are interrupted for ſome Time; nevertheleſs the Functions of the *Cerebellum*, and the natural Motions, are continued as much or rather more during our Sleep than when we are awake.

As a further Confirmation of what has been alledg'd hitherto, we may add, that when we firſt awaken from our Sleep, we find our Brain turgid with Blood, and ſomewhat heavy or lumpiſh. The Reaſon of this ſeems to be, that whilſt we are aſleep, the Membranes of the Brain ceaſing in their Pulſation, the Motion of the Blood is not at this Time further'd by the Contraction of the

e beforeſaid Membranes ſo much as when e are awake, and conſequently the Blood uſt of Neceſſity be detain'd and ſtagnate r ſome ſmall Time in the Membranes of e Brain. But all this while, when we are leep, the Arterial Blood finding its Paſſage ro' the Brain intercepted in ſome Meaſure, in the greater Quantity carried to the *Ce-bellum*; and this is the Reaſon why the tro-aerious Particles do paſs in a greater uantity whilſt we are aſleep into the *Cere-llum*, and the Nerves that have their Riſe om thence; and therefore it is, that thoſe tural Functions that depend on the *Cere-llum*, are performed better whilſt we are leep than when we are awake.

From what has been ſaid, we may ac-ount alſo, why in the ſoporoſe Affections ſo ſmall a Share of Reſpiration is ſufficient to the Support of Life; for we ſee in theſe Diſeaſes that Reſpiration is in a Manner quite ſuppreſs'd, ſo that there are not wanting Inſtances of ſome People that were affected with them having been buried for dead when they were actually alive: For conſidering that in the ſoporoſe Diſeaſes the nitro-aerious Particles are carried only to the *Cerebellum*, and thence to thoſe Nerves that are deſigned for the natural Functions; and that beſides this, theſe Functions are but very ſuperficially performed in theſe Affections; 'tis therefore that there is not any conſiderable Loſs or Conſumption made of the nitro-aerious Particles, and conſequently a very ſlender Share of Reſpiration is ſufficient to repair it.

CHAP. V.

Of the Ferments of the Stomach, the Sweetbread, and the Spleen; as alſo ſomething relating to thoſe Diſeaſes that depend on the Animal Spirits.

BY this *Hypotheſis* of ours concerning the Nature of the Animal Spirits, not only he Effervescency that is made in the Parts o be moved, but alſo the Cauſes of the Fermentations, and all Manner of Concoctions, n the *Viſcera* of the Animals, may be very onveniently explained.

And firſt of all, as to the Digeſtion that performed in the Stomach, 'tis the common Opinion, that there is ſome acid Ferment lodged within the Stomach; but they re not able to tell us from whence this Acid hould or does take its Origine; for it is bvious by the Anatomical Obſervations, hat there is no ſuch Thing as an Acid lodg'd n the Stomach when in a State of Health: And as to what concerns the ſowr *Ructus*, heſe ſeem rather to owe their Riſe to ſome ll digeſted Aliments, than ſome natural acid Liquor or Juice.

But here it is objected how it comes to aſs, that when we take the Filings of Steel nwardly, it is corroded in the Stomach, and urn'd as it were into a Vitriol; for after the aking of Chalybeate Medicines inwardly, certain ſulphureous and vitriolate Scent or Smell may be perceived in the Throat, juſt the ſame as is commonly obſerved in the Steel or Iron when corroded by ſome acid Liquid. Beſides that, Milk will coagulate in the Stomach as if it had been turned to Curd by ſome acid Liquor, and our Aliments, after they are in the Stomach, will often contract a Sowrneſs.

In reference to this, I lay down as a Rule or Suppoſition, That the Digeſtion of the Aliments is performed by the Animal Spirits carried thither by the Nerves, which are in great Numbers inſerted into the Stomach; ſo that, according as the Animal Spirits are either in greater or leſs Quantity convey'd to the *Viſcera* deſigned for Digeſtion, the Digeſtion of the Aliments will be performed either the faſter or the ſlower.

Hence it is, that in caſe a Man immediately after eating is intent on his Studies, or puzzling his Brain about ſome difficult Matters, by Means whereof Part of the Animal Spirits are by this attentive Contemplation, and extraordinary Agitation of the Mind, detained in the Brain, the Office of Digeſtion is not accompliſhed as it ought to be

for Want of Animal Spirits; but the Aliments remaining undigeſted in the Stomach, the Animal feels a Heavineſs and Oppreſſion in it, as every one may and does perceive in himſelf; whereas at another Time on the contrary, when the Mind is free from any puzzling Thoughts or Conſiderations, as likewiſe when we are aſleep, the Concoction of the Aliments ſucceeds very well; *viz.* becauſe the Animal Spirits being not then employed in or diverted by any other Functions, are in the greater Quantity carried to the *Viſcera* deſigned for Digeſtion.

Hence it is alſo, that ſoon after a plentiful Dinner or Supper we are very much inclined to Sleep; *viz.* the Stomach being full of Victuals and Drink, the Animal Spirits for the moſt part are carried to the *Cerebellum*, and thence to the inferior Region or *Venter* of the Body, there to aſſiſt in the Action or Office of Concoction; ſo that there being ſcarce any left behind in the Brain to perform the ſenſatory and voluntary Functions, hence it is, that we have enough to do to keep our ſelves from ſleeping.

Now conſidering that the Animal Spirits do conſiſt of nitro-aerious Particles, 'tis no very hard Task to conceive in what Manner the aforeſaid Effects are produced by them in the Stomach.

For though the nitro-aerious Spirit is no Acid, yet by it Iron may be corroded and turn'd into Vitriol, fix'd Salts may be made fluid, and the whole *Compages* or Frame of Things may be open'd or diſſolv'd as by the univerſal *Menſtruum*; as I have endeavoured to prove in another Place.

It ſeems then moſt agreeable to Reaſon, that the ſo much celebrated Ferment of the Stomach does chiefly conſiſt of nitro-aerious Particles, which being thro' the Nerves convey'd into the Membranes of the Stomach, are there (as it ſeems very probable) intermix'd with ſome other proper Juice, ſeparated from the Blood with the Help of the glandulous Membranes of which the Stomach does conſiſt, both of which being by ſome peculiar Veſſels carried into the Cavity of the Stomach, do make up its fermentative Juice.

Hence it is, that a ſerene and thin Air is ſo very convenient and proper, as well to create an Appetite, as to ſettle the Stomach after any Exceſs committed in eating and drinking, as is ſufficiently known by Experience; whereas in a thick Air, ſuch as is infected with noxious Vapours or Exhalations, the Stomach is often oppreſs'd by the Aliments we take.

Add to this, that from the Bladder that is found in moſt Fiſhes full of an aerious Subſtance, there is a Communication by Means of a certain Canal or Duct into the Stomach; which ſeems to intimate, that ſomething of an aerious Nature is required for the better Concretion of the Aliments; as has been obſerved likewiſe by the Learned Dr. *Needham*.

For conſidering that the Fiſhes draw but a ſlender or moderate Quantity of Air in from the Water, it was (as it ſeems) neceſſary, that this aerious Ferment ſhould be laid up in ſome certain Receptacle, from whence it might be carried in ſuch a Quantity as was requiſite for the Digeſtion of the Aliments.

But whether in terreſtrial Animals, beſides the nitro-aerious Spirits carried by the Nerves to the Stomach, there be alſo an aerious Ferment convey'd thither immediately from the ſanguineous Maſs, I am not able to determine.

In my Opinion, the digeſtive Juice of the Stomach approaches pretty near to the Nature of the *Saliva*; for the *Saliva* ſeems to be a Compoſition of the nitro-aerious Particles, which by Means of the Nerves are diſcharged upon the maxillary Glandules, and there intermix'd with the ſerous *Latex* convey'd thither by the Blood; and I take it for granted, that the *Saliva* being in Maſtication intermix'd with the Aliments, does not only further their Deglutition, but alſo contributes a conſiderable Share towards their Digeſtion.

When the Stomach is empty, and without any Aliments within its Cavity, its interior Membranes are (as it ſeems very probable) vellicated by the nitro-aerious Particles, which produces that which we call Hunger. The Aliments after Chewing and Deglutition are by the Ferment of the Stomach converted into a *Chymus*, which being fallen down into the *Inteſtinum Duodenum*, is there mix'd with the *Bile*, ſo that by this Mixture with a new Ferment as it were, the *Chymus* is

ſtill more fermented and further con-
cted: For the Bile conſiſting of ſalino-
lphureous Particles, it muſt of Neceſſity
ppen, that they ſhould go into an Effer-
ſcency with the *Chymus*, which conſiſts of
d abounds in nitro-aerious Particles; and
at the Bile is endued with a fermentative
uality, ſeems to be evident from thence,
at if ſome Part of it be mix'd with a Paſte
ade of Flower, it will ferment and raiſe
at Paſte; as has been ſhewn in another
ace.

f the Ferment of the Pancreas *or* Sweetbread.

Think the *Pancreas* deſerves to be num-
ber'd alſo among the *Viſcera* that are de-
ned for and contribute to the Concoction,
being very probable that the Nerves, ma-
of which are diſperſed thro' the *Pancreas*,
intended for the carrying of the nitro-
ious Particles thither, which being pro-
led there with a proper Vehicle ſeparated
m the Blood by the Means of this Gland,
diſcharged into the *Inteſtinum Duodenum*
o' the *Viſurian* Duct for the further Fer-
ntation of the *Chymus*; *viz.* whenever this
ncreatick Juice, which abounds in nitro-
ious Particles, meets with the *Chymus*
unding with bileous, *i. e.* with ſalino-
phureous Particles, there muſt of Neceſ-
ariſe a very intenſe Efferveſcency from
Intermixture of both of them, by Means
ereof it is very probable that the Con-
tion of the *Chymus* is accompliſhed.

After I had written this concerning the
cera, a Treatiſe of the Ingenious *Reyner*
Graaf concerning the Pancreatick Juice
come to my Hands, in which the Learned
thor proves the Exiſtency of the Pancrea-
k Juice beyond all Contradiction, as like-
ſe confirms what I have ſaid concerning
Uſe.

But after all, I cannot perſwade my ſelf
t the Pancreatick Juice, if in a healthy
ſpoſition, ſhould be of the Nature of
ds: Neither is it probable that the ſaid
ce, when intermix'd with the Bile in the
eſtines, ſhould enter into an Efferveſcen-
becauſe the acid Salt of the Pancreatick
ce does enter into a Conflict with the fix'd or volatile Salt whereof the Bile does conſiſt, as the Ingenious Mr. *De Graaf* is of Opinion that it does; for this Efferveſcency of the Salts of a contrary Nature does not ſeem very ſuitable to the Conſtitution of the Animal Oeconomy, *viz.* conſidering that it is ſo ſoon over, neither is effected without a Coagulation; as has been ſaid before.

Beſides this, every acid Salt, if mix'd with a Liquid of a ſalino-ſulphureous Nature, fixes its ſalino-ſulphureous Particles, and deſtroys them, and together with them turns into a *Calx* or *Caput mortuum*, that remains indiſſoluble, as it is obſervable in the *Lac Sulphuris*, and in the Bile it ſelf if mix'd with ſome acid Liquid; whence it is alſo, that the acid Salts are very proper to allay the inordinate Fermentations of the Bile.

But on the contrary, in the natural Fermentation that is made in the Inteſtines, the ſalino-ſulphureous Particles of the Bile are raiſed to their due Volatility, as is evident by the Stink that comes from the Excrements after their Ejection, and the Inflammability of the *Flatus* that break out from behind.

'Tis therefore moſt probable, that the Efferveſcency ariſing upon the Intermixture of the Pancreatick Juice with the Bile, owes its Cauſe to this; that the nitro-aerious Particles wherewith that Juice does abound, does enter into an Efferveſcency with the ſalino-ſulphureous Particles of the *Bilis*, this producing ſuch a Fermentation as is moſt proper to exalt the ſalino-ſulphureous Particles of the Bile; as has been ſhewn already in another Place.

Of the Uſe of the Spleen.

LET us alſo, before we conclude this Head of Efferveſcencies, give you ſome Conjectures concerning the Uſe of the *Spleen* according to this our *Hypotheſis*. If we conſider the moſt admirable Structure of the *Spleen*, its Bulk, as well as the numerous Branches of Nerves belonging to it, beſides the great Afflux of Blood that is carried thither; I ſay, if we make due Reflection upon all theſe Things, we can't but conclude, that the Spleen (which is found in all Sorts of Animals) muſt certainly be deſigned for ſome publick Office or Function.

What

What is moſt ſurprizing is, that the Animals, even after the Spleen is quite cut out, don't only live without it, but even don't find any conſiderable manifeſt Inconveniency for Want of it.

'Tis this that has raiſed ſo many Diſputes concerning the Office or Function of the Spleen among the Anatomical Authors, that the Spleen ſeems to be almoſt as troubleſome a Piece to the Phyſicians, as to thoſe that are afflicted with its Diſeaſe; ſo that it ſeems as if Nature, by giving to the Spleen its dark black Colour, had intimated to us, that it ſhould be kept concealed and involved in Darkneſs. Some Authors have aſſigned ſo frivolous a Uſe to the *Spleen*, as would make any Man laugh even tho' he were half eaten up with the Spleen.

To make you therefore the more ſenſible of my true Sentiments concerning the Spleen, I ſhall be obliged to repeat here again what I have ſaid already before, *viz.* That it is very probably abſolutely neceſſary for the Support of the Life of the Animal, that the Animal Spirits, *i. e.* the nitro-aerious Particles, ſhould have a conſtant free Paſſage thro' the Brain, or at leaſt thro' the *Cerebellum*; and that 'tis upon that Account, that when Reſpiration, or the Motion of the Heart, is ſuppreſs'd or interrupted only for one Moment, the more perfect Animals die in an Inſtant.

From this Suppoſition this Inference flows naturally, That the nitro-aerious Particles muſt without Intermiſſion bé carried back from the Brain by the Means of certain Veſſels; and it is more than probable, that the Nerves being deſigned for the natural Motions, thoſe of them that go to the *Viſcera* were intended alſo to bring the Animal-Spirits from the *Cerebellum*.

Now conſidering that there is ſometimes a greater, ſometimes a leſs, Quantity of the nitro-aerious Spirits required for the juſt Performance of the natural Functions, and eſpecially the Concoction of the Aliments, and that the nitro-aerious Particles do almoſt with an equal Stream flow to the *Cerebellum*, it was neceſſary that thoſe of the ſuperfluous nitro-aerious Particles, *i. e.* ſuch of them as would not be employ'd in the natural Functions, ſhould be carried off another Way.

And in Effect it ſeems very probable, that the Spleen was framed on purpoſe that the ſuperfluous nitro-aerious Particles might its Aſſiſtance be thoroughly mix'd with ſanguineous Maſs.

For theſe nitro-aerious Particles be through the Nerves of the Spleen diſcharg into the Spleen, are by it intermix'd in their moſt minute Parts with the Maſs Blood, after having been before-hand perſed through its *Parenchyma*: Whence is, that by the Commixture of the nitro aerious Particles with the ſalino-ſulphureo of the Blood in a great, but equal, Quantity, there ariſes a very conſiderable, but too impetuous, an Effervescency; ſo that the Spleen ſeems to perform theſe three following Functions:

1. The nitro-aerious Particles which p continually and ſucceſſively thro' the Bra and are not employed in the natural or an mal Functions, are reconvey'd into the M of Blood, and intimately mix'd with it.

2. To carry the nitro-aerious Particles a juſt Quantity and due Order to the *Viſcer* that are deſigned for the Concoction of t Aliments; for according as theſe *Viſcera* leſs or more repleniſh'd with or empty Aliments, ſo they ſtand in Need either of greater or leſs Quantity and Afflux of the fermentative Particles.

3. To qualify the nitro-aerious Particle when put into Motion and Vigour, and in termix'd with the ſalino-ſulphureous of th Blood in the *Compages* of the Spleen in the moſt minute Parts, to raiſe ſuch an Effervescency in the ſanguineous Maſs, as is requiſite to raiſe its ſalino-ſulphureous Particles to a juſt Degree or Pitch of Volatility.

As to what relates to the firſt Offices aſſigned to the Spleen, theſe ſeem to be manifeſted to us by theſe various Intertexture and Communications betwixt the *Nervi ſplanchnetici* and the other Nerves that are diſperſed thro' the other *Viſcera*; for by the Means of theſe Communications, it comes to paſs that the nitro-aerious Particles, according as Occaſion requires, ſometimes in greater, ſometimes in leſs, Quantity, are carried to the *Viſcera* that are deſigned for the Concoction of the Aliments, and for the Performance of the other natural Functions, and that the ſuperfluous or remaining nitro-aerious Particles may be carried into the Spleen.

This furniſhes us with a Reaſon why, en the Spleen is turn'd ſcirrhous, or elſe ers an Obſtruction, the Patient is trou- d with Belching, and hypochondriack us; for, conſidering that in ſuch a Caſe nitro-aerious Particles can't any longer, they uſed to do before, paſs through the tructed Spleen, they are carried promiſ- uſly, and without any due Order or Mo- ation, into the Stomach, the *Pancreas*, the other *Viſcera* deſign'd for Con- ion: Whence it is, that theſe being in great a Quantity mix'd with the *Chymus* the Stomach, and the other Parts of the domen, the Concoction of the Aliments, of the *Chymus*, is performed too faſt; that of Conſequence there muſt ariſe ndance of flatulent and impetuous Fer- ntations in thoſe Parts.

'Tis furthermore to be conſidered, that never the nitro-aerious Spirits can't be harged into the Spleen, by reaſon of its g obſtructed, 'tis very probable, that ſometimes regurgitate towards the n and the *Cerebellum*; by which prepoſte- s Motion, the true Motion of the ani- Spirits is perverted alſo, and conſequent- he Brain and animal Oeconomy is much urbed, as it is frequently obſerved to hap- in hypochondriack Affections; tho' this ariſe alſo from ſome other Cauſe, as ll be ſhewn hereafter.

Unto this may be added alſo in this Place, in young Children the Spleen is of a id ruddy Colour, whereas in adult Per- s it turns into a blackiſh blue Colour. s Difference in its Colour ſeems to come n thence, that the nitro-aerious Particles n young Children carried only in a ve- lender Quantity to the Spleen, ſo that ſcarce produce any Effervescency at all e, as will be ſhewn more at large here- t. And the Reaſon why the Spleen does as yet perform its Office in young In- s, ſeems to be this:

he *Fœtus* in the Womb, as alſo a new- n Infant, don't perform any Exerciſes, or eaſt no violent ones; and conſequently e is no Neceſſity for any extraordinary iolent Motion of the Heart and the Parts gn'd for Reſpiration, for theſe natural ctions are chiefly augmented or increaſed aſe of any violent Exerciſes or Motions of the Body, as has been ſhewn before. Hence it is, that the nitro-aerious Particles are tranſmitted very ſlowly, and with an even Current, into the *Cerebellum*, and ſuch Nerves as have their Riſe from thence; but more eſpecially in the Womb, where the Infant does not make uſe of the Parts deſign'd for Reſpiration. Whence it is, that the Spleen is uſeleſs all that Time; for conſidering that the nitro-aerious Particles paſs only with a very ſlender Stream thro' the *Cerebellum*, they are very near altogether employed and ſpent in the performing of the natural Functions: But when the Animal grows older, and begins to be uſed to more violent Exerciſes, there is a Neceſſity for a greater Quantity of theſe nitro-aerious Particles to be carried thro' the *Cerebellum*; ſo that by this Time the nitro-aerious Spirits do open to themſelves certain ſpacious Ducts in the *Cerebellum*, whilſt the Structure of the Brain is made more firm and compact; ſo that upon that Account the nitro-aerious Particles may afterwards take their Paſſage with much more Eaſe and Plenty through the Brain, and the Nerves that have their Riſe from thence. And conſidering alſo, that theſe Particles are not altogether expended in the performing of the natural Functions in due Manner, it is of an abſolute Neceſſity, that this ſuperfluous Part of the nitro-aerious Spirits ſhould be diſcharged by the Help of ſome *Viſcus*, *i. e.* by the Spleen, into the ſanguineous Maſs, and be mix'd with it in its moſt minute Parts.

Unto this may be added, that whilſt the *Fœtus* remains as yet within the Womb, the *Viſcera* that are deſign'd for the Concoction of the Aliments, do either not perform their Offices at all, or if they do, it is in a very ſlight ſuperficial Manner; whence it is, that the nitro-aerious Spirits are not as yet carried, or at leaſt in a very ſlender Quantity to the *Viſcera*; and conſequently there is not the leaſt Neceſſity for any Part of them to be convey'd to the Spleen.

'Tis further to be obſerved, that the Infant in the Womb, or ſoon after it is born, is fed moſt conſtantly, or at leaſt very frequently, ſo that its Stomach is never empty of Victuals; and therefore the nitro-aerious Spirits do with one continued Stream, and without any Period or Intervals, flow to the

the *Viſcera* deſign'd for Concoction: But when the Animal is come to its full Growth, he takes his Aliments at certain Intervals of Time, ſo that his Stomach is ſometimes full and at other Times empty of Victuals; and conſequently the nitro-aerious Particles muſt of Neceſſity, ſometimes in a greater, and other Times in a leſs Quantity, be carried to the *Viſcera* deſign'd for Concoction.

And that this Afflux of the nitro-aerious Particles might be performed in due Order to the *Viſcera*, there was a Neceſſity for a certain *Viſcus*, in the *Parenchyma* of which the ſuperfluous Remainders of the nitro-aerious Spirits might be depoſited, as has been ſhewn before.

As the chief Office belonging to the *Spleen* does not take Place in Infants, ſo there is no Neceſſity alſo for its other Function; *viz.* the more intenſe Effervеſcency of the Blood (which we told you was made in the Spleen) in young Children: It being very probable, that the foreſaid Fermentation which is made in the Spleen was intended for and produces chiefly this Effect, that the ſaline ſulphureous Particles of the Blood are by it raiſed to their due Pitch of Volatility, for their better performing of the Functions of Motion and Procreation, which two Functions are not ſuitable to the tender Age of young Infants.

That there is ſuch an Effervеſcency made in the *Parenchyma* of the Spleen, by the Commixture of the nitro-aerious Particles carried thither by the Help of the Nerves with the ſaline ſulphureous Particles of the Blood, may be gathered from the following Reaſons.

It has been found by Experience, that when there is an Obſtruction in the Spleen ariſing from a *Scirrhus*, that the ſanguineous Maſs is deprived of its due Fermentation, and remains crude, and without Spirits; ſo that moſt commonly it is followed by a Dropſy or a *Chloroſis*. And from whence this Fermentation in the Spleen ſhould be able to take its Riſe, unleſs it be from the nitro-aerious Particles which go into an Effervеſcency with the ſalino-ſulphureous Particles of the Blood, I am free to confeſs I know not.

For I cannot by any Means agree in Opinion with thoſe Authors, who tell us, That the thick and firm Part of the Blood, being detained in the Compages of the Spleen, does by its long Stay there contract a fermentative Nature; for in caſe it be ſuppoſed, that any of the Particles of the Blood were ſtopp any where in their Motion, and did ſtag nate, How is it poſſible for thoſe that follow to continue their Motion, without pro ducing (of Neceſſity) Tumours and Inflam mations in that Part where the Circulatio of the Blood is thus interrupted? Beſides that thoſe numerous Twigs of the Nerv that are diſperſed thro' the Spleen, ſeem t be deſign'd, and to ſerve, for no other U than to carry the fermentative Partic thither.

Add to this, that, as in caſe when the Fe mentation in the Spleen is too remiſs, th Blood becomes crude; ſo on the contra if it proves extraordinary, beyond its du Meaſure, the ſanguineous Maſs does acqui ſomething of an aduſt and utrabilearic Nature.

As for Inſtance: In the Fire, the nitr aerious Particles going into too exceſſive a Effervеſcency with the ſalino-ſulphureo Particles, do burn them up, and turn the into a *Fuligo* in a Moment's Time, as w have had Occaſion to ſhew in another Plac In the ſame Manner, in caſe it ſo happe that the nitro-aerious Particles are raiſed i to too violent an Effervеſcency in the *Par chyma* of the Spleen, it will certainly b that theſe Particles contract an aduſt and f liginous Nature, which being fix'd with the Compages of the Spleen, its Colour w ſeem to be a dark Purple, inclining t Black.

This utrabilearious Diſpoſition, or Di theſis of the Blood, may owe its Origine Two different Cauſes:

(1.) If the ſalino-ſulphureous Particles the Blood are detained in the Spleen, b reaſon of its *Parenchyma* being obſtructe for in this Caſe, when their Effervеſcen with the nitro-aerious Particles is of t long a Continuance, they will turn ad and dry. It ſeems as if the Body of t Spleen was a Compoſition of two Sorts Veſſels, ſome of which, *viz.* the nervous F bres, are deſign'd for the Diſtribution of nitro-aerious Particles, and the others the Diffuſion of the Blood; and beſides

ſo for the Reception of the nitro-aerious articles. If an Obſtruction happens in the rſt of theſe two, by the Influx of the fer-ientative Particles being intercepted from he Spleen, the ſanguineous Maſs remains eſtitute of its due Ferment; but in caſe his Obſtruction is in the latter, the ſalino-ulphureous Particles, by their being de-in'd too long, and fermenting beyond due leaſure, do acquire an acid and aduſt, or hich is the ſame Thing in Effect, an atra-ilearious Nature.

(2.) If the Compages or Frame of the pleen is corroded, or torn aſunder by any ther Way, the nitro-aerious Particles are ow no more, as they uſed to be before, in-rmix'd in their moſt minute Parts, and qually in its *Parenchyma*, but are rather urried in a Confuſion into the Maſs of lood; from whence ariſing too violent an fferveſcency, this will render the ſalino-ſul-hureous Particles of the Blood aduſt and uliginous.

From what has been ſaid, it may eaſily e underſtood how it comes to paſs, that an nimal, tho' deprived of ſo noble a *Viſcus* the Spleen, is nevertheleſs able to live; iz. that tho' the beforeſaid Functions per-rmed by the Spleen, are ſuch as conduce ot a little towards the Preſervation of the ue Animal Oeconomy, and a perfect State f Health, yet are they not of ſuch a Ne-ſſity, but that Life may be in ſome Meaſure reſerved or continued without them.

And here I can't but by the by make this bſervation, That all the Parts of the Ani-al conſiſt of a conſiderable Quantity of olatile Salt, but ſcarce contain any fix'd lt; as is manifeſt by their Diſtillation, and urning them to Aſhes, and yet moſt of the nimals feeding ſcarce upon any Thing elſe t Vegetables, in which there is very little, ſcarce any volatile Salt at all, but a con-derable Share of fix'd or nitrous Salt; it ems as if the fix'd Salts of the Aliments, their nitrous Part, were within the Body the Animal, which not improperly may ſtiled the true chymical Laboratory of Na-re, were tranſmuted into volatile Salts.

Unto this may be added, That if you take y Plant which contains no volatile Salt at l, and let it putrefy till it produces Worms, u may then draw a very conſiderable deal of volatile Salt from them by Diſtilla-tion.

But as to the Manner or Method of this Volatilization of the fix'd Salts of the Ali-ments, 'tis very probable that the various Concoctions and Fermentations made in the Bodies of Animals, do not a little conduce to this Volatilization of the Salts. But after all we have ſufficient Reaſon to believe, that the Spleen is the chief Officine or Labo-ratory where the nitrous Salts of the Ali-ments elaborated into volatile Salts.

For it is to be obſerv'd, that when the Ve-getables are burnt to Aſhes, their nitrous Salts are volatilized, and theſe flying up-wards together with the ſomewhat aduſt ſulphureous Particles, make what we call the *Fuligo*; for this *Fuligo* contains a vola-tile Salt, notwithſtanding thoſe Vegetables that were burnt to Aſhes, and from whence it draws its Original, conſiſted before their Combuſtion only of a fix'd nitrous Salt.

It is very probable, that as when Nitre and Sulphur, being mix'd together as in the Gun-powder, are burnt together, the fix'd Salt, whereof the Nitre conſiſts in Part, is during the Conflagration volatilized, and carried up into the Air; for were it not ſo, the fix'd Salt of the Nitre would remain behind after its Conflagration; *viz.*

In the Deflagration of the Nitre, the ni-tro-aerious Particles which it contains being by the Help of the ſulphureous, when ſet on Fire, put into a very ſwift Motion, do break aſunder the ſaline Particles, wherewith they were very ſtrictly united before, into very minute Parts, and thus, as it ſeems very probable, do volatilize them.

And now, ſince by the fiery impetuous Effervescency of the nitro-aerious and ſul-phureous Particles, the fix'd Salts of the Ve-getables may in an Inſtant be reduced or brought into a State of Volatility, what Reaſon have we not to imagine, but that the intenſe Effervescency of the nitro aerious and ſulphureous Particles in the Spleen ſhould not be ſufficient for the Volatilization of the fix'd or rather nitrous Salts of the Chyle? Unto this may be added alſo, that the ſalino-ſulphureous Particles do turn ſomewhat aduſt and of a ſuliginous Nature in the Spleen, as has been intimated before.

And here it would be no difficult Matter to prove, that all the Fermentations which are made in the Animal Body, without Exception, do arise from the Effervescency of the nitro-aerious and sulphureous Particles, were it not foreign to our present Purpose.

Of those Diseases that have a Relation to the Nitro-aerious or Animal Spirits.

FRom this our beforesaid *Hypothesis* relating to the Nature of the Animal Spirits, it is easy to determine wherein the Animal Oeconomy does consist; as likewise to give and assign the Causes of most of those Diseases that have a Relation to the Function of Motion.

In order to preserve the Animal Life, it is absolutely necessary that the Lungs should be in a healthy Disposition; that so the nitro-aerious Particles may be convey'd in a sufficient Quantity into the Mass of Blood, and be intermix'd in their most minute Parts with its sulphureous Particles. Hence it is, that whenever the Lungs begin to be weak, or flaccid and consumptive, the sanguineous Mass is not fermented as it ought to be, for Want of the nitro-aerious Particles, and consequently there being a considerable Defect of the moving Particles of both Kinds, there must of Necessity follow an excessive Weakness and Want of Strength, and a Consumption of the whole Body.

Furthermore, towards the due Performance of the Animal Functions, it is required, that the nitro-aerious Particles, after they have been convey'd into the Mass of Blood, should be carried likewise to the Brain, and to the Nerves that have their Rise thence; so that whenever the nitro-aerious Particles are either not carried in a sufficient Quantity to the Brain, or else can't find a free Passage through the obstructed Nerves, the Animal Oeconomy and Function of Motion must of Necessity be much disturbed: And 'tis from thence that the Apoplexy, the Palsy, and such like other Diseases, seem very often to take their Origin, as has been said before.

As it is requisite that the nitro-aerious Particles should be carried to the Brain, so on the contrary the salino-sulphureous Particles must not come there at all; for whenever these, either by reason of their excessive Subtilty, or else by reason of the Pores of the Brain being too open, or else by reason of the excessive Fermentation of the Blood, do break in upon the Brain, they do there put the nitro-aerious Particles, *i. e.* the Animal Spirits, into disorderly Motions, which produces no small Disturbance in the Animal Oeconomy; as it is very probable that it happens thus in the Epilepsy, after excessive Drinking, and such like other Diseases, because we see that when such Liquids as abound in a volatile Sulphur, such as the Spirit of Wine, the Chymical Oils of the Vegetables are taken too fast, they produce such like Diseases.

Unto this may be referr'd what I have observ'd more than once my self, *viz.* That I have seen some Persons that used to be afflicted with frensical and convulsive Paroxysms, the Spittle of which during these Paroxysms, if put into the Fire, would burn out into a Flame, in the Nature of an Oil or Gunpowder; for it seems very probable, that in the foresaid Case, the salino-sulphureous Particles of the Blood were exalted to such a Degree, that making a violent Irruption into the innermost Recesses of the Brain, they put the Animal Spirits into disorderly Motions.

In Reference to the Melancholy and the *Mania*, it is very probable, that the salino-sulphureous Particles of the Blood being detained in the *Parenchyma* of the Spleen, and there entering into a continued Effervescency with the nitro-aerious Spirits, do acquire an atrabilearious and malignant Nature; and that besides this they are so far subtilized, that they penetrate very far into the Brain, and raise a Disturbance among the Animal Spirits.

For it is very probable that such like Diseases, which have a Relation to the Brain, do not so much arise from any vitious Disposition of the Animal Spirits, as from their Motion being disturbed, or else from their being defective; for considering that the Animal Spirits do consist of an Æthereal Matter, they can't be subject to any Alterations, as has been intimated before.

For

For the further Preſervation of the Ani-al Function and Motion, it is requiſite, at the ſanguineous Maſs ſhould be impreg-ted with ſalino-ſulphureous Particles, and ch as are brought to their due Degree of altation; that ſo the nitro-aerious Par-cles being intermix'd with them, may raiſe proportionable or due Effervescency in the aſs of Blood.

For it is neceſſary for the Support of the nimal Life, that the ſalino-ſulphureous articles ſhould by the continued Fermen-tion of the Blood be raiſed to their juſt De-ree of Volatility, ſo that being afterwards ith the Help of the fleſhy Part of the uſcles ſeparated from the Blood, they may e thence carried to the Parts that are to be oved, as I have endeavoured to ſhew efore.

But in caſe theſe ſalino-ſulphureous Par-icles are not ſufficiently ſubtilized, for want of a ſufficient Fermentation of the lood, or are not ſo ſoon as they ought to e ſeparated from the ſanguineous Maſs, by eaſon of ſome vitious Diſpoſition in the uſcular fleſhy Part, the Function of Mo-ion can't be well performed, ſo that it is ore than probable, that that ſpontaneous aſſitude and Heavineſs, which are the com-on Attendants of the Scurvy and Yellow-aundice, proceed from that Cauſe; for heſe Symptoms which are obſervable in hoſe Diſeaſes, ſeem to owe their Origin ot ſo much to any Want of Animal Spirits, s to the vitious Diſpoſition of the muſ-ular Fleſh.

And here we may by the by take No-ice alſo, that thoſe ſlight Convulſions, which appear like the catching in the Ten-dons, and are moſt commonly obſerved in lingering Fevers, may ſometimes ariſe alſo from a vitious Diſpoſition of the fleſhy Part of the Muſcles; foraſmuch as not only the ſalino-ſulphureous Particles, but the nitro-aerious alſo, penetrating through the *Paren-chyma* almoſt conſumed before, are ſo tranſ-mitted into the Parts that are to be moved, ſo that by the mutual Effervescency of both of them, there follows in all Probability theſe ſlight Contractions of the Fibrils by Intervals.

From what has been ſaid, we may ac-count for another Thing relating to theſe Diſeaſes, *viz.* Why Exerciſe of the Body is ſo beneficial by Way of Precaution againſt the *Icterus* and the Scurvy, as well as againſt the Return of the Paroxyſms of the inter-mittent Fevers.

For, when we put our Body in Exerciſe, the nitro-aerious Particles are by the more intenſe Reſpiration carried in greater Quan-tity into the Maſs of Blood, and the Motion of the Blood is much accelerated by the Contraction of the Muſcles; whence it is, that the Fermentation of the Blood being increaſed, theſe Particles are ſubtilized, and the Paroxyſm diminiſh'd.

Beſides, that the ſalino-ſulphureous Par-ticles of the Blood being raiſed to their full Vigour, are in the Contraction of the Muſ-cles ſeparated from the Blood and conſumed, from the too great Quantity of which in the ſanguineous Maſs the feveriſh Paroxyſm takes its Riſe, as has been ſhewn in ano-ther Place.

Of Digeſtion, Chylification, *and the* Apparatus *thereunto conducing. From* Gliſſon, Willis, Havers, Drake, *&c.*

THE great Author of all Things, whom, to avoid unneceſſary Multi-plication of Words, we often call *Nature*, having in his inſcrutable Wiſdom thought fit to create a great Variety of *Ani-mals*, and to appoint them different Ways of ſubſiſting, has alſo given them very dif-ferent Organs to preſerve that *Aliment* by which they are to be *nouriſhed*.

Of theſe, ſome being to break and divide the Maſs upon which they are to feed, are furniſh'd with *Teeth* of different Kinds according to their ſeveral Exigencies. Thoſe which feed upon Fleſh have *Teeth* in every Part of both Jaws, ſome of which are to divide the Maſs into Morſels, others to comminute and grind it after it is ſo divided, which from their different Offices are called *Inciſores* or *Cutters*, and *Molares* or *Grinders*. Some Animals which are *graminivorous* have the *Inciſores* in the lower Jaw only, becauſe the Matter upon which they feed is eaſily broken into ſuch Parcels as they can readily ſwallow. Of the firſt Sort are *Men*, *Lions*, *Bears*, *Wolves*, &c. Of the latter are all the *ruminant* Kind, ſuch as have *Horns* and *ſplit Hoofs*, as *Oxen*, *Deer*, *Sheep*, &c. Others, which are generally ſuch as live upon *Grain*, or other Sorts of *Food* that do not want to be broken before they are ſwallow'd, have no *Teeth*; but inſtead of them, have an *Ingluvies* or *Crop*, wherein the *Food*, which is generally hard and dry, is macerated and ſoften'd before it is tranſmitted to the *Stomach*, which is muſculous, and ſtronger than in other *Animals*, and ſerves inſtead of *Teeth* to break and grind the Aliment ſo macerated in order to *Digeſtion*.

Of this Sort are moſt Kinds of *Fowl*, eſpecially the *granivorous*; though ſome others which are Birds of *Prey*, and live upon *Fleſh*, have no *Teeth*, yet they have ſomething analogous to the *Inciſores*, which is generally a ſharp *crooked Beak*, that ſerves to cut and divide that which they feed upon. Theſe have no *Gizzards* or *muſculous Stomachs*: And tho' there are ſome which have ſomething like *Teeth* in their *Beaks*, yet theſe *Teeth* do not ſerve them either to divide or grind their Food, but to take the ſurer Hold of their Prey only, and are peculiar to the *Fiſhing Fowls*, whoſe Prey would otherwiſe be more apt to eſcape them; and ſome of the *Water Fowls* that eat Herbs, which, if their Beaks were not indented, would ſlip from them. Theſe, as well as ſome Sorts of *Reptiles*, as the *Viper* Kind, have *Teeth*, yet ſwallow their Prey whole.

I have mentioned theſe ſeveral Kinds of *Dentation* in order only to examine the true Service of *Maſtication*, which ſeems to be in a Manner peculiar to Men: For tho' ſome other *Animals* uſe it, it ſeems to be only when their Food is too hard or too dry to be ſwallowed unchew'd, as *Lions*, *Dogs*, *Bears*, &c. when Neceſſity forces them to eat Bones; or *Horſes*, Beans, Peaſe, Oats, or other hard dry Things. In theſe Caſes, *Maſtication* ſeems to be purely preparatory to *Digeſtion*, and to be neceſſary to reduce the Aliment to ſuch a State as may fit it for the Operation of the Stomach; but whether that contributes any more than bare *Comminution* remains yet a Queſtion. Men, who maſticate more upon leſs Neceſſity than other Animals, are generally thought by Authors in that Action to impart ſomething to the *Maſs* beſides the *Comminution*, which they ſuppoſe conduces in an extraordinary Manner by way of *Ferment* or *Menſtruum* to the Solution of what they eat. But as this *Maſtication* is not conſtant nor equal in all Men who ſeem to digeſt with equal Facility, it is ſtill a reaſonable Doubt, whether ſome Uſes which they have aſſigned to *Maſtication* be true ones or not, and whether *Luxury* and the Pleaſure of *Eating* has not taught Men to chew more than other *Animals* in order to have the fuller Reliſh of their *Food*.

It is certain, that many Creatures as well provided for *Maſtication* as Men, and whoſe *ſalival Glands* diſcharge as much as the humane into their Mouths, do not give themſelves the Trouble of ſo much *Maſtication*, and yet with the ſame *Apparatus* of *Organs* digeſt as quick, if not quicker, than Men. And if *old People* who have loſt all their *Teeth* have ſometimes worſe *Digeſtions* than thoſe who have not, other Cauſes may reaſonably be aſſigned for that Infirmity of *Digeſtion* than the Want of *Teeth*; for it is obſervable, that younger Perſons, who ſometimes from other Accidents loſe their *Teeth*, have not their *digeſtive Faculty* weaken'd in Proportion; not to mention, that many *Animals*, which have either no *Teeth*, or do not uſe thoſe they have to chew with, ſeem to have as vigorous a Concoction as thoſe that do. However, I ſhall not deny but that the *Comminution* of the *Aliment* between the *Teeth* ſerves to promote and haſten the *Solution* in the *Stomach*, which it may do by

bare

breaking the Coheſion, without ſuppo-
any Neceſſity of a *Menſtruum* to do it
wards.

ny *Species* of *Birds*, eſpecially the *little*
that feed upon the ſmaller Sorts of *Seeds*,
ave no *Teeth*, nor any Thing that bears
ogy to them, except the ſharp Edges of
little *Beaks* may be thought to do ſo,
however a Uſe of their *Beaks* which
me Meaſure anſwers the End of *Maſti-*
; for by theſe they crack the Seeds, and
the Help of their Tongues ſeparate the
Pulp from the dry Husks which they
all; and particularly all of the *Parrot*
, which will feed upon the Kernels of
, and other Things which are too large
ſwallow'd whole, have a Sort of Action
h looks very much like Chewing, by
h they nibble upon what they eat till
reduce it to very ſmall Parts, though it
s not ſo much in order to mix it with
Ferment, as to reduce it to ſuch a State
ay make it paſs the eaſier; and perhaps
ey have any *Saliva*, it is no more than
s to lubricate and facilitate the ſlipping
eir Food down to the Stomach, which
ld not be ſo eaſily effected if it were
as moſt of the Things they live upon

hoſe that generally feed upon Grain, as
he *Gallinaceous*, *Turkey*, *Pheaſant* and *Par-*
e Kind do, are obſerv'd to ſwallow every
g haſtily, without any Stop of it in
Mouths, or Endeavour to break it there:
then indeed they have an *Ingluvies* or
, where it remains ſome Time for *Mace-*
n before it be tranſmitted to the *Stomach*,
ch thoſe that contend for a *Ferment* may
is given them inſtead of *Maſtication* to
egnate the *Aliment* with ſuch *Ferments*,
ch however is *gratis dictum*; for tho' the
of ſuch *Fowls* be furniſhed with *Glands*,
the *Grain* which they eat be actually
n'd by the Soaking which it receives
, yet no real Solution or Separation of
s is made but in the *Gizzard*, the Strength
whoſe Muſcles and internal Membrane,
ch is hard and dry, as well as the little
es and Grains of Sand which theſe lit-
Fowl ſwallow, ſhew theſe Parts to be
rived for *Attrition*, and not for *Fermen-*
n, which the Narrowneſs and Strength
hoſe Parts will not give Room for.

It is true, that moſt, if not all, *Fowls* of this Kind, have at the lower End of their *Oeſophagus* or *Gullet* a conſiderable Quantity of *Glands*, which afford a Liquor more *viſible* than even thoſe of the *Craw*, and which many *Anatomiſts* ſuppoſe to ſeparate a *fermentative Juice*. But for that we ſhall aſſign another Uſe, which it cannot be denied to be proper for, when we come to ſpeak of the Converſion of the diſſolv'd *Aliment* into *Chyle*.

There are divers Kinds of Animals that not only have *Teeth*, but have them likewiſe ſharper and more numerous than Men, or indeed any Sort of *Quadrupeds*, as divers Kinds of *Fiſhes*, and all the *Serpent Kind*; yet none of theſe uſe them for *Maſtication*, as appears from their Figure and Poſition, which renders them abſolutely unfit for it; for in Fiſh, moſt of which have three, four or more Rows of Teeth in each Jaw, they are generally extreme ſharp, and not planted oppoſite to each other, but ſo as to make when cloſ'd together a Kind of *Indentation* like that of two *Saws*, ſo wrought as to receive each other mutually, which is not a Poſition proper for *grinding*, but very convenient for catching or laying hold of any Thing. In the Serpent Kind there are likewiſe divers Rows of Teeth extremely ſharp, but all incurvated and pointing towards the Throat, which is a Situation very proper for entangling and helping to ſwallow their Prey, which is uſually ſmall living Creatures, which they devour whole; but altogether unfit for dividing, *comminuting* or bruiſing. Some Sorts of Fiſh which prey upon the ſmall Shell-fiſh, ſuch as *Cockles*, *Muſcles* and *Sea-Snails*, have indeed a Sort of flat broad Teeth, which reſemble in ſome Meaſure in Uſe as well as Figure the *Grinders* of Land Animals, that is, they ſerve to break the Shells of thoſe little Fiſh before-mentioned. Theſe are variouſly diſpoſed in the different *Animals*, ſome in the *Throat* or upper Part of the *Oeſophagus*, as in the *Orbis marinus*; others even in the *Stomach* it ſelf, as in *Lobſters* and *Crabs*, which have three at the Bottom with peculiar Muſcles for their Motion and Compreſſion.

As Providence has allotted for the Suſtenance of the ſeveral Kinds of Animals a great Variety of Food, ſo it has given them likewiſe

likewiſe a proportionable Diverſity of Organs for the Preparation of it, beſides thoſe which ſerve for the firſt *Diviſion* and *Maſtication* already ſpoken of. The various Sorts of Animals have according to the different Occaſions of their Kind of Aliment a great Variety of *Stomachs* both in Point of Number and Structure, which may however in the main be reduced to three principal or general Heads, of which, in order to illuſtrate our Notion of *Concoction*, we ſhall ſpeak more particularly; for though the ſeveral *Species* be almoſt indefinite, yet theſe being moſt conſiderable and beſt known to us, may ſuffice to ſhew the mechanical *Apparatus* of *Nature* for this Operation.

The Three I mean, are the *Carnivorous*, the *Graminivorous*, and *Granivorous*; the different *Mechaniſm* of whoſe *Stomachs* ſeems under one Head or other to conclude all the Conditions neceſſary for the *Solution* of any Thing conducing to Animal *Nutrition*, and of each *Species* of which there are ſome Animals in each habitable Element, unleſs we will deny any *Fiſhes* to be ſtrictly *granivorous*, the Water not ſpontaneouſly affording them any ſuch Food. According to the uſual Method, Hunger ſhould firſt be accounted for; becauſe it is that which provokes us to eat, and therefore the accidental Cauſe of all that follows in the Courſe of *Digeſtion*: But that being agreed by all Authors, however differing among themſelves otherwiſe in Opinion, to depend upon the ſame active or efficient Cauſe with *Digeſtion* in it ſelf, it will ſave an unneceſſary Multiplication of Words to poſtpone the Account of it to another Place.

Authors are very little agreed about the immediate Inſtrument by which the Aliment is diſſolv'd in the *Stomach*. Some will have it to be done by meer *Attrition* or Grinding by the *Stomach* it ſelf: Others impute it to a forcible *Diſſolution* of *Heat*. But the Opinion which is moſt eſpouſed, is, That it is performed by Means of a *Ferment* or *Menſtruum*; yet of what Nature or to which Claſs it belongs, they are as little agreed among themſelves, as thoſe who would have it performed ſome other Way. Thoſe who would have it done by *Attrition*, impute it to the rubbing of the *Stomach* upon the *Aliment* by its *periſtaltick* Motion, and fortify themſelves by the Obſervation that Fowls and Birds eat *Grain* and *Seeds* have not only a ſtr *muſculous Stomach* lined inwardly wi thick tough *Membrane* fit for Grinding do likewiſe aſſiſt that *Operation* of the *mach* by ſwallowing Grains of *Sand* and *tle Stones*, which are always found with their Meat in the *Gizzards* of *Fowls* when they have eaten hard Meat, leſs it be in *Domeſtick Fowls*, which have coop'd up, and reſtrain'd from comin them.

If indeed Men did feed, as theſe Fowl upon *Grain* or hard Meat without *Ma tion*, and were furniſhed with a *Stoma* tight, firm and ſtrong, and ſo lined, would not be an improbable *Hypotheſis*: as our Food and Manner of Eating are different, ſo is the Mechaniſm of Natu and as the Texture of the main Organ Concoction, the *Stomach*, is ſoft, ſmooth yielding, Qualities altogether oppoſite thoſe that are required to Grinding, ſo P vidence has given us an Appetite to Th reſoluble another Way. But if *Grindin Attrition* were the humane Way of *Diges* the Mouth ſurely, and not the *Sto* would be the proper Place where it ſhoul performed; for that is furniſhed with T proper Inſtruments for that Purpoſe. whatſoever *Maſtication* may contribute wards *Digeſtion*, that it is not the only, indeed the main, Inſtrument of it, we already ſufficiently proved by the Inſtan we have given of the many *Animals* wh Food is of the ſame Subſtance with o which *maſticate* very little, and moſt of not at all.

Wherefore if the Stomach were capable grinding the *Aliment*, as ſome ſuppoſe, muſt however in a little Time neceſſarily worn, as all other Bodies which grind Degrees are, how hard ſoever, eſpeci ſince many Things which we uſe as F are harder and tougher even than the *Sto* it ſelf. But they are miſtaken who th that even in *granivorous Fowls* the Gr which they eat is ground in the *Gizzar* thoſe Creatures, which is, tho' unbroken, ways macerated, ſwell'd and ſoft; ſo the *Gizzard* has not much more to do t to break the *Husk* or *Cortex* of it to red it to a *Pulp*: And for this very End it

all these Sort of Animals are furnish'd an *Ingluvies* or *Crop*, where the *Aliment* ys makes a considerable Stay, and in h it is often found soft, tho' always un- e, if it be *Grain*. Whether this Mace- n proceeds from any Liquor separated he *Glands* of the *Craw*, or from the Wa- which those *Fowls* drink, may be a reaso- e Question. But as those *Glands* do not sufficient of themselves to furnish Li- enough for that Purpose without their nk; so on the other Hand it is not un- onable to believe, that the Liquor which afford may contribute towards making Drink, with which it mixes more e and piercing, and so serve to soak it r and quicker than simple Water would

hose that would have the Aliment to be olv'd in the *Stomach* by the meer Vertue *Heat* only, like a Kind of *Elixation* or *ing*, will find a great deal of Difficulty rove their *Hypotheſis* reasonable, unless call in some other *Mechanism* or Cir- stance than has yet been advanc'd: For Body as yet have given any satisfactory son, why Meat should dissolve faster in *Stomach* than it does out of it by the e Degree of Heat, or indeed a much ter It would be impertinent at this e of Day to pretend, that *Culinary Fire* not so *natural* a *Dissolver* as the *Vital mal Heat*; and yet no Care has been ta- by those that hold this Opinion, to find any other certain Property of this *Heat*, which they might rationably ascribe that *eleration* of *Solution* which is observ'd in Stomach by many Degrees to outstrip Dissolution which is made in the usual gans over a common Fire; and to pre- d that the *Heat* was actually greater, and re intense than that which is us'd in *Cook-* our Victuals, would not only be a bare- d Assertion against Fact, but against Rea- likewise. For if it really were so, Why uld not the *Stomach* it self be boil'd and olved by the Heat, as well as the Meat tained in it; which would constantly pen in all other Operations by Fire or t, if the Matter contained were as hard be dissolv'd, and would resist as strongly, the Vessel containing? But not to pur- an Opinion any farther, which yet may seem to have a tolerable Foundation, we will proceed to examine the *Reigning Hypotheſis*, which, taken in its largest Extent, is become of late the Favourite and only prevailing Opinion.

Those who observing how unqualified the *Stomach* of *Carnivorous Animals* generally is for *Attrition* or *Grinding*, and therefore could not believe the Aliment to be reduc'd to a *Pulp* that Way, and yet were not satisfied that the Incalescence of the *Stomach* was sufficient for that Operation, have call'd in the Help of a *Menstruum*, or a dissolvent Liquor, by Means of which they have thought to account better for the speedy *Resolution* of the Contents of the *Stomach*, than by either of the other more simple Ways.

But this being Matter rather of Imagination than Fact, easier to be suppos'd than prov'd, after first conceiving a Necessity of such a Liquor, they have employ'd themselves more generally to invent the *Properties* and *Qualifications* of it, than to discover whether in Reality it had a Being or no; so that this *Hypotheſis* stands altogether upon Conjecture, as well as to the Existence of their *Menstruum*, as to the Nature, Properties and Derivation of it. From hence it comes to pass, that such a Variety of *Menstruums* have been invented, every Man feigning it to be such as he conceiv'd would best answer the Difficulties and Doubts which he propos'd to himself to resolve by it. Hence some have fancied it to be an *Acid*, others *Alkalious*, a third Sort *Sulphureous*, a fourth *Acido-sulphureous*, others *Alkalino-sulphureous*, *Muriatick*, or of any other Kind that their Fancy suggested to them as proper for the Work of *Dissolution* or exciting of *Appetite*.

As many Conjectures they have had about the Place of Nativity of this *Menstruum*: Some fetch it from the *Spleen* by the *Vas Breve*, others from the Brain by the *Nerves*; some from the *Blood*, by the *Arteries* in the *Stomach*; and others from the *Glands* of the Mouth and *Stomach*: In Favour of all which curious Notions, and fine Speculations, have been advanc'd at the Expence of *Truth*. The *Chymists*, and *Physicians chymically* given, have generally been the Patrons of an *Acid Ferment*, upon a Notion at large, that *Acids* are the *universal Dissolvents*; which Opinion many others have given into, upon the

the Account of ſome few *Phænomena* which they could, or thought they could reſolve by it; but eſpecially upon the Account of an *Aphoriſm* of *Hippocrates* which they think countenances it, though miſtakenly. This Great Father of Phyſick has ſaid, That *Acid Belchings, ſupervening upon inveterate Lienteries*, that is, *upon Looſneſſes from a too great Slipperineſs of the Inteſtines, where they were not before, are a Sign of mending:* And in another Place he ſays again the ſame Thing a little more at large, and affirms, that whether this Symptom come ſpontaneouſly, or be procur'd by Art, it equally cures the Diſtemper. From hence ſome would infer, that *Hippocrates* ſuppos'd *Acids* to contribute to good *Digeſtion*, becauſe thoſe Signs of *Acidity* in the *Stomach*, whether they come ſpontaneouſly, or were artificially ſuperinduced, generally ſignifies according to him a *Solution* of that Diſeaſe which was attended with *crude Dejections*.

But ſurely they ſtrain his Meaning very much, who will from either of theſe Paſſages make the *Divine Old Man* hold, that the *Acidity* of the *Stomach* was neceſſary *ad Eupepſiam*, in the natural State: Whereas in Truth all that he ſays in this Caſe, concludes no more than that theſe *Acid Belchings* ſignify'd, That the State of the ſick Perſon was alter'd for the better, when the *Aſſumpta* remain'd ſo long as to turn ſowr upon the *Stomach*; or at moſt that *Acids* given inwardly, and ſtaying ſo long as to ſend their Exhations upwards, might contribute to the Cure; a Poſition which any Body may admit, without ſuppoſing an *Acid* to be the neceſſary Inſtrument of Concoction in a natural State: But what Signs ſoever *Acid Belchings* may be in a morbid State of this Kind; no Sort of *Ructus* or *Flatulence* whatſoever is any Sign of a good *Digeſtion* in a State of *Health*.

However, they that have been prepoſſeſs'd in Favour of an *Acid Menſtruum* in the *Stomach*, have very greedily laid hold of this Occaſion to draw ſo great an Authority over to their Side. The other Argument which they bring for their Opinion, from the Obſervation that *Acids* provoke *Appetite*, is as much ſtrain'd and fallacious as this. For tho' *Acids* may by pricking and vellicating the *Stomach* procure a Senſe of *Hunger*, and perhaps by mixing with, cutting and precipitating that *viſcous Phlegm* or Matter, which the *Stomach* is ſometimes overlo even to the *Proſtration* of *Appetite*, ma cidentally procure a better *Digeſtion*, as ſcoure and cleanſe the *Stomach*; yet that Proof that any ſuch Sort of *Menſtru* neceſſary, and primarily imploy'd by Na in the Action of *Digeſtion*. For divers o Things which are not manifeſtly *Acid*, ſome that are even oppoſite to, and de ctive of *Acids*, will ſometimes do the Thing, as is notoriouſly known of the *ters*, eſpecially to all *Practitioners* in *Phy* and in ſome Caſes, when judiciouſly appl of the *Volatile Animal Salts*, and Lixi Vegetable ones.

But neither do *Acids* ſeem naturally to promote Chylification, or to produc Liquor which they are of themſelves prone to coagulate, as we daily ſee by t *Coagulations* which the ſlighteſt *Acids* pro in *Milk*, which is nothing elſe but *Chyl* little defæcated. For tho' *Milk* upon ding will indeed turn ſowr without other Mixture, yet whenever it does ſo, perience ſhews, that the Form of the is immediately deſtroy'd by it; and ſu ciently demonſtrates thereby, that ſuch State of *Acidity* as theſe Men would ſuppo is utterly inconſiſtent with the Being of t Liquor. Neither do they ſhew us, that they could poſſibly conſiſt together, ther in a *Humane Body* any *Matrix* that ſho produce and furniſh this *Acid Menſtru* either in the *Stomach* or any other Part.

The *ſowr Remains* of *Chyle*, which after learned *Gliſſon*, *Willis*, and ſo many oth have taken up with for Want of a better pedient, that might have ſome Shew o real Exiſtence, to do the Office of an *Ferment* or *Menſtrum*, to cut and div by its ſharp corroſive Parts the new inge *Aliment* in the *Stomach*, in ſo ſhort a T as *Digeſtion* is ordinarily made in, is by Means an Inſtrument ſufficient for the P poſes aſſigned. For beſides that, it is a Q ſtion whether any Part of the *chylous M* does ever remain behind in *Statu ſano* in Folds of the *Stomach*, after *Chylification* co pleat, and Exinanition into the *Inteſti* It is ſtill a further Queſtion, Whether th Remains be naturally ſowr or not? *Aur* has ſeldom favour'd the affirmative Part

of theſe Points; but has very often ed directly to the contrary, as may be ntly experienc'd in Dogs, which are per Subjects for ſuch Trials as we can Deſire. In theſe I have often expreſly t for theſe Remains of *Chyle*, ſays my or, but could never ſee any Signs of uch Thing, nor taſt any the leaſt Degree *idity* upon the inner Coat of the *Sto-*; tho' I made my Trials upon 'em when Appetites appeared to be as keen as could poſſibly well be, and conſequent- is ſuppoſed *Vinegar* of the *Stomach* d have been in its higheſt State of Exal- . Neither would any of them turn tho' I ſometimes boil'd 'em in it, and ers kept it in them as long as was rea- le to avoid making a fallacious Ex- ent.

oſe that plead for theſe acceſcent Re- s of *Chyle*, thought themſelves ſufficient- arranted by the *Plicæ* or Folds of the Coat of the *Stomach* to ſuppoſe a Re- of ſome Kind or other, and which ſuppoſing it to reſemble Milk in that *ty* too, expected ſhould turn *ſowr*. Not iſt here upon the Infirmity of Rea- s drawn from final Cauſes, or from *ies* not ſufficiently conſider'd, both are to be found in this *Hypotheſis* of *id Remains* of *Chyle*. It is eaſy to ſhew he *Rugæ* or *Plicæ* of the inner Mem- of the *Stomach* were not unneceſſarily only to detain this Matter, which eam of, but upon mechanical Neceſ- or the outer *Tunick* of the *Stomach* be- de *fibrous* and *contractile*, or *dilatable*, ng as the *Stomach* is empty or full, er muſt neceſſarily obey its Motions, her ſhrink up, or dilate with it; or iſe be wrinkled or folded up when *rior* was not dilated. But this *Con-* is not to be found in any *glandu- villous* Membranes, and conſequently might be ſometimes dilated to all the ions of the *Stomach* when full, and nply with all its Coarctation, in its eſt State of Contraction, which Mem- f this Nature have no Power to do, be made to ply and fold as this *Mem-* es.

that love final Reaſons for ſuch may be ſatisfied to know, that it was by no Means convenient that the inner *Coat* of the *Stomach* ſhould be endow'd with a Power of *Contraction* like the outward; for all ſuch contractile *Membranes* are extremely *ſenſile*, which upon many Scores it is not proper the Inſide of the *Stomach* of *Animals* ſhould be; ſince by its Inſenſibility it is guarded againſt innumerable Provocations, which otherwiſe could not be avoided, and does here to the ſenſible Parts of the *Stomach* what the *Cuticula* does to the *Cutis*.

Indeed, many of thoſe who have contended for an *acid Ferment* in the *Stomach* have been very ſenſible of the Inſufficiency of any ſuch *Acid* as might be form'd out of the Remains of *Chyle*; and have looked out for other Means, notwithſtanding the famous Inſtance of the *Rennet-Bag*, whoſe Liquor being ſalted and pickled, bears no Analogy to what was found in the *Calves Stomach* before Pickling: Nor indeed are the Effects of the *Rennet* ſo made any Thing like to what they aſcribe to this *Menſtruum*; for that coagulates, and this diſſolves: This digeſts the *Milk* which the *Calf* lives upon, and that deſtroys it, and renders it leſs fit for Nouriſhment than before.

All the Trials that have been made by *Artificial Digeſtions* to diſſolve *Fleſh*, have been made with *Acids* of another Claſs and Nature than *ſowr Milk*, or any of that low Form of *Acids*, which they have found by Experience to preſerve, not deſtroy it, as *Vinegar* and thoſe *Salts* which abound with *Acids* do. Neither are thoſe Meats ſo preſerv'd more obedient to the Faculties of the Stomach for having been *pickled*, or of better Nouriſhment, as they ſhould be if they contain'd any Thing congenial to the *natural Ferment* of the *Stomach*; but on the contrary, they become harder of *Digeſtion*, and of leſs nouriſhing Juice.

Doctor *Havers* finding theſe *Acids* inſufficient to diſſolve and reduce Fleſh to a Pulp, propoſes an Experiment with Oil of *Vitriol*, which he ſays will do it. But being well aware of that obvious Objection, that it is morally impoſſible for the *Stomach*, without the utmoſt Danger, to bear ſo highly *corroſive* an *Acid*, he propoſes to qualify it by an *oleaginous* Mixture, ſomething like Oil of *Turpentine*. To illuſtrate this Notion, he puts *Raw Fleſh*, *Crums of Bread*, Oil of *Turpen-*

tine, and Oil of *Vitriol* together, and after ſhaking them well, commits them for four Hours together to *Digeſtion* in *Balneo Mariæ*, and then, upon ſhaking his Glaſs again, he finds the Meat diſſolv'd, and all together making up a thickiſh Pulp: From whence he concludes, That the *Menſtruum*, which diſſolves the Aliment in the *Stomach*, muſt be ſomething of the Nature of the Mixture of thoſe two *Oils*.

But, with all due Regard to the Notions and Experiments of ſo ingenious a Man, he has been too haſty in drawing his Concluſions, and ſhould have regiſter'd the other *Phænomena* of his Experiment, before he rais'd ſo large an *Hypotheſis* upon ſo narrow a Bottom as the ſeeming Agreement in one ſingle Accident, *viz.* the Reduction of the Meat to a *Pulp*. He ſhould have ſhewn that this Pulp, or the Liquor which it afforded, agreed perfectly in *Taſt*, *Colour*, *Smell*, *Conſiſtence*, and other Accidents, with the *Chyme* or *Chyle* that reſult from *Animal Digeſtion*. But unleſs the Liquor which this Maſs afforded was ſuch a *ſweet*, *ſoft*, *white*, *inodorous Juice*, all the Demonſtration his Experiment amounts to, is, That the *Oils* of *Vitriol* and *Turpentine* mix'd, will reſolve and reduce *Fleſh* to a *Pulp*; but will not make *Chyle*: Which ſhews his Experiment ſomething worſe than uncluſive, that is, it is concluſive againſt the Uſe he would make of it.

However, the Doctor is ſo ſatisfy'd in the Sufficiency of his Experiment, that he proceeds to inquire how this *Fermentative*, *Vitriolick*, *Terebinthinate Mixture*, is form'd in an Humane Body; and imagines to find two divers Sorts of Liquors, one *Acid*, and the other *Sulphureous*, ſeparated from the *Salival Glands*, and mix'd in or about the Mouth, which tho' apt to ferment upon their firſt Mixture, are yet perhaps apt to do ſo more conſiderably when they come to be digeſted by the Heat of the *Stomach*. And in this Opinion he fortifies himſelf with two other Experiments, which he made after the ſame Manner upon Meat, with Oil of *Vitriol* mix'd ſeverally, one with a Solution of Salt of *Tartar*, the other with Oil of *Camphire*, which did not ſucceed ſo well as the Experiment with Oil of *Turpentine*; from whence he draws this particular Concluſion: *And I do the rather think one of thoſe Juices which conſtitute the* Saliva, *to be of the Nature of Oil of* Turpentine *than of a fix'd Salt, becauſe it will correct and temper even Oil of* Vitriol, *ſo as to render it more tolerable to the Fibres of the Stomach. Not that I ſuppoſe the acid Part of the* Saliva *to come near to the Acidity of Oil of* Vitriol; *for tho' they are mix'd, they will make a Liquor that may not be injurious to the Stomach: Yet that acid Juice, if it were ſo corroſive as Oil of* Vitriol, *would certainly be injurious and painful to the ſalivatory Ducts, which convey it to the Mouth before it is mix'd with the oleaginous Liquor; but I only ſay it is an Acid, and in ſome Degree approaches to the Nature of that Oil.*

It is obvious for the Reader to diſcern that this *Hypotheſis* ſtands purely upon the Foot of the Experiment before mentioned, which has been ſhown to be inſufficient. But if it were not, nothing could make it certain, but the actual Demonſtration of the real Exiſtence of ſuch Liquors ſincere and apart in the Body, and their Conveyance together into the *Stomach*. For this Purpoſe the Doctor aſſigns two Pair of the *Salival Glands* to the Separation of the *acid Liquor*, and the other two Pair for the Oil of *Turpentine*, as diſtinctly as if he had really found and examin'd them ſufficiently apart; which is the more ſurprizing, becauſe it is in Reality no hard Matter to do it, and that Experience does conſtantly ſhew, that the Glands do not afford Liquors ſo much ſenſibly diſtinguiſhable, and that the Liquor which they do afford, does not in the leaſt reſemble either Oil of *Vitriol* or Oil of *Turpentine*, or any Kind of acid or volatile eſſential Oil whatſoever. Nor indeed do any Part of the Body afford any ſuch Kind of Subſtances at any Time, or by any Trial or *Analyſis* whatſoever.

The Objections which lie againſt this *Hypotheſis*, and that before mentioned of the *ſour Chyle*, reach all Sorts of *Acido-ſulphureous Menſtruums* in the *Stomach*: For if they be temper'd like the firſt, they will not be corroſive enough to procure a *Solution*. If they be not, but exalted *Acids*, they are liable to the ſame Exceptions juſt now offer'd, as nothing reſembling either of them in either State is to be found among all the *Animal Fluids*.

The

Thoſe that hold the *Menſtruum* of the *Stomach* to be *alkalious* or *alkalino-ſulphureous*, are ſomewhat more countenanced in their Opinion by the Subſtance which may be produced by the Help of Fire from all Sorts of *Animal Fluids*, all which yield volatile *Alkalious Salts*, *Spirits*, *Phlegm*, *Oil*, and *Caput mortuum*, differing only in Proportion according to the different Mixture of the Liquor it is drawn from, whether that be *Urine*, *Blood*, *Bile*, or any other. But tho' all theſe Subſtances may be drawn from the natural Juices of the Body, and may be allowed to have præexiſted in them; yet it muſt be confeſs'd, that all of them are in ſome Meaſure alter'd by the Fire, tho' that Alteration may perhaps be no more than would reſult from any other Reſolution of their Mixture. However, if any of them will after this Separation act ſo vigorouſly upon Fleſh as to diſſolve it in ſuch a Heat as that of the *Stomach* may be granted to be, that Activity is certainly owing to the *Exaltation* which it had from the Fire; for no where in the Body in its natural State do we find any *Salts* or *Sulphurs* ſo exalted, as to be capable of making ſuch a *Diſſolution*.

Neither is it eaſy to diſcern, let this exalted *Salt* or *Sulphur* be convey'd by what Ways or Means ſoever the Patrons of this Opinion will or can ſuppoſe, what hinders the *Menſtruum*, that ſo readily diſſolves the *Aliment*, from touching the *Stomach* it ſelf, which is oftentimes of the ſame or ſlighter Texture than even the Matter which it diſſolves; and one might as well expect, that *Aqua fortis* put upon Pieces of Iron in an *Iron Pot* ſhould diſſolve the Pieces of the Metal without touching the Veſſel, which is an Experiment perhaps no Chymiſt would be perſwaded to try.

This Objection indeed holds againſt all Kinds of *Menſtrua* in the *Stomach* as *Diſſolvers*, whether we ſuppoſe them *acid* or *alkalious*, *ſaline* or *ſulphureous*, or however mix'd; ſtill the Matter to be wrought upon is the ſame, or of the ſame Kind, with the Veſſel in which it is to work: They therefore that will have a *Menſtruum* to be the efficient Cauſe of the Diſſolution of the Aliments in the *Stomach*, are obliged to find ſomething in the Aliment it ſelf before it comes into the *Stomach*, which muſt be a Condition the *Stomach* it ſelf has not, that diſpoſes it to receive the Impreſſion of the *Menſtruum*.

This ſome endeavour to find in the Impregnation of the *Aliment* with *Saliva* by Means of *Maſtication*: But if the *Saliva* were a Juice ſo very acrimonious, it would be impoſſible for it never to offend the *Stomach*, eſpecially conſidering the Quantities of it that many ſwallow even upon an empty *Stomach*. However, the ready *Digeſtion* that thoſe Animals have which do not *maſticate* at all, but ſwallow their Prey whole, which has already been taken Notice of, demonſtrates the Inſufficience of that Cauſe.

Whatſoever therefore this *Ferment* or *Principle* of *Fermentation* is that ſets the Wheels of Diſſolution ſo nimbly a going, it muſt be ſomething internal and inherent in the Aliment it ſelf, which is an Opinion of ancient Standing, but has been rejected for that of a *Menſtruum*; becauſe an inward Cauſe or Condition ſufficient for this great Operation was not ſo expreſly and by Name aſſigned, as that ſpeculative and curious Men might have wherewithal to ſatisfy their Inquiries, and judge of the Truth of the *Hypotheſis*. However, they that went thus far, tho' they did not clearly and explicitly diſcover all, did good Service to Truth; and had they who rejected that Opinion been as ſcrupulous about the Evidence of thoſe others which they took up in its Stead, it is probable it had not loſt Ground, but that the *latent Property* upon which this grand *Phænomenon* depended had long e'er now been brought to Light.

In order therefore to diſcover what this great Secret is, which has been ſo long ſought after with ſo much Induſtry, and ſo little Succeſs, it will be neceſſary to conſider Three Things: Firſt, What is the State or Condition of the *Aliment*, as Nature's or our own Preparation offers it to us, before it enters the Mouth. Secondly, What Changes it undergoes in the Mouth before it reaches the *Stomach*. Thirdly, What it ſuffers in the *Stomach* in order to a thorough *Diſſolution*.

Firſt then, All thoſe Subſtances upon which any Sorts of Animals feed may be reduced to one of theſe two general Heads, either of Animal, or Vegetable; which being Subſtances of their own Nature peri-

riſhable or ſubject to Decay, their Diſſolution may be haſten'd or retarded by Accidents.

Secondly, All thoſe Subſtances, before they come into the Mouth, or at leaſt as ſoon as they come into it, are deprived of their *Animal* or *Vegetative Life*, and conſequently in a State of natural Decay, the Principles or Means of which they carry along with them, which are only put into or haſten'd in their Action by the Changes which they ſuffer in the Mouth or Stomach, *&c.*

From theſe Things well attended to, we ſhall not only be able to obſerve the Means which Nature uſes in the Diſſolution of the Food in *Animal Stomachs*, but likewiſe of the great Variety of Organs which ſhe has made for that Purpoſe; at leaſt we may by Attention arrive at it for thoſe of whoſe Anatomy and Way of Living we know the *Hiſtory*. Of all theſe Kinds which are reckoned perfect, the *Apparatus* for *Digeſtion* is moſt ſimple in the *Carnivorous*, moſt of which will live upon Fruits likewiſe, in which their Organs are ſuited to their Diet, which is the eaſieſt of *Digeſtion*. For *Fleſh*, *Fruits*, and *Sallad Herbs*, being the moſt ſucculent of all the Kinds of Food which any *Animals* naturally eat, they ferment of themſelves, and come to a *digeſtive Solution* much more readily than *Grain* or *Seeds*, or any Kind of *dry Vegetables*; the Reaſon of which has been already given in diſcourſing of *Fermentation*.

Men do however generally prepare what they eat, eſpecially the *Fleſh*, by divers Kinds of *Dreſſing*. Whether this Cuſtom was firſt introduced by *Luxury* or *Neceſſity*, is not a very material Inquiry here: But if by ſuch *Dreſſing* the Parts of the Meat be render'd more looſe and leſs coherent, it becomes thereby of eaſier *Digeſtion* in the *Stomach*; if otherwiſe, as in *Pickles*, *long ſalted* and *dried Meats*, it becomes harder of *Digeſtion* for it, and generally of worſe Nouriſhment. Of all the Things that Men eat, the *Horary* or *Summer Fruits* are of quickeſt *Solution* if ſtrip'd of their Rinds, becauſe the Body of them is more ſoft and ſucculent than that of other Things we eat. Next to theſe, in Point of quick Solution, are the *Lactucina* or the *ſucculent Sallad Herbs*, which abounding with heterogeneous Juices, eaſily *ferment* with Heat.

The laſt and longeſt of *Digeſtion* of all the Kinds of Foods that *Carnivorous Animals* naturally ſeek, is *Fleſh*, which, tho' its Parts be both ſucculent and ſoft, yet are neither ſo juicy, nor ſo ſoft and looſely coherent, as either of theſe beforementioned: And perhaps, as well out of Neceſſity as Luxury, Obſervation at firſt taught Men by *Roaſting* and *Boiling*, and other Kinds of *Dreſſing*, to looſen the *Compages*, and ſoften the Parts of what they were to eat; yet many whole Countries, even to this Day, reject the whole Art of Cookery, and eat their Meat *raw*, and for any Thing we can ſee, as much to the Advantage of their Health and Vigour, and perhaps as much to their Luxury.

Men do likewiſe eat *Grain*, and ſometimes *Roots*; but theſe are always prepared when uſed as a conſtant Sort of Diet, as Bread is by Grinding, Fermenting and Baking, whereby the Subſtance of the Grain is not only broken very ſmall, but the mix'd Maſs made of it afterwards is occaſioned to cohere very looſely, and to contain a great deal of Air which contributes to its future Diſſolution in the *Stomach*. We do indeed uſe *Grain* divers other Ways beſides in *Bread*, *Pyes* and *Puddings*, which have all ſomething very analogous in their Preparation: But then we macerate and ſoften the *Grain* by previous Boiling or Steeping, and reduce it ſomething nearer a State of *Fluor* than it is found in the *Craw* of *Fowls*, which does the ſame Office, but need not carry it ſo far as our artificial Preparations do; becauſe the *Gizzard* of *Fowls* being much ſtronger and more *muſculous*, are conſequently better able to grind it, eſpecially by the Help of thoſe little Stones or Grains of *Sand* which they conſtantly ſwallow.

The *Indians* many of them uſe *Roots* inſtead of *Grain* to make their Bread of: But then even the Rudeſt of them prepare it by ſome ſort of *Maceration* and *Fermentation* previous to their eating of it, that may reduce it to ſuch a State as may give the Stomach leaſt Trouble in the Diſſolution of it. Thoſe *Animals* which are oblig'd by Nature to live upon Food, ſomewhat harder than that of Men, yet have no *Ingluvies* to prepare and macerate it for the *Stomach*, ſuch

Marmouſets, *Squirrels* *Rats* and *Mice*, that eat hard wild Fruits, *Nuts*, *Cheeſe*, *Roots*, &c. are obſerved to nibble a long Time with their *Inciſores* or Fore-teeth, which in thoſe Creatures are very long, ſtrong and ſharp, till they have exceedingly comminuted the Matters they eat, which are generally too hard for *Maſtication* in theſe ſmall Animals, and therefore they anſwer that End by gnawing that very ſmall with their Fore-teeth, which they would not have Strength enough to break with their *Grinders*.

Some have deny'd the *Fructus Horaris* and *Lacticinia* to be of eaſie Digeſtion; becauſe they obſerve, that they frequently produce *Flatulencies*, Gripings, and other troubleſome Symptoms. But this Objection ſprings from Want of conſidering *Digeſtion*, Chylification and *Nutrition*, as diſtinct Operations, which they confounding together, call that hard of *Digeſtion* which does not yield much *Chyle*, or prove good Nouriſhment. It is true indeed of many of theſe Sorts of *Fruits* and *Herbs*, that they are apt to raiſe Diſorders in the *Stomach* and *Inteſtines*: But this Fault proceeds not from a Difficulty to be digeſted, but from too great a Promptitude to it, and from the *fermentative* Diſpoſition of the Juices which they yield, which will not let them remain long enough in the *Stomach* and *Inteſtines* to be ſubacted or qualified by the Mixture of other Things there for good *Chyle* and Nouriſhment; ſo that their Crudity or unalter'd Simplicity of Appearance when they come away, proceeds from an over-haſty, not too *ſluggiſh*, Solution in the *Stomach*.

This generally is the *State*, and theſe the Conditions, of humane Food before it comes into the Mouth. That of other Animals generally undergoes no Alteration, except it be that of *Domeſtick Animals*, which ſometimes eat *dry Meat*, ſo called in Contradiſtinction to that which is *green*, which is harder of *Digeſtion* than the other; but theſe are generally very great *Maſticators*, whether they have but one ſimple *Stomach*, as *Horſes*; or four, as the *Ruminants* have.

The Second *State* of the *Aliment* which we propos'd to conſider, is that which is introduced in the Mouth, which depends almoſt wholly upon *Maſtication*. It ſeems to have two Ends: The firſt to bruiſe and comminute the Maſs, and render its Coheſion more lax, and thereby the Separation more eaſy in the *Stomach*: The other is to mix, and as it were incorporate it with the *Saliva*, and ſo render it more apt to ſwell and *ferment* in the *Stomach*. For all Liquors containing ſome *Air*, are apt to rarefy more or leſs in *Heat* according to the Proportion they contain of it. But the principal Uſe of the *Saliva*, as well as of the *Juice* ſeparated in the *Stomach*, is to facilitate the Mixture or Incorporation of the ſeveral *Fluids* of the Meat and Drink after the Solution of the more ſolid Part is accompliſhed, and to unite them under that *lacteſcent Form* from which they are denominated *Chyle*.

This Alteration of the *Aliment* in the Mouth is more conſiderable in and neceſſary to *Ruminants*, and other Animals that feed upon drier and harder Food than the *Carnivorous* do; and indeed Mankind excepted, who enjoy it in no Proportion to them, it ſeems to be peculiar to that Sort of Animals, and accordingly Nature has provided for it by a peculiar Organization in giving them a *Plurality* of *Stomachs*, into the firſt of which their Food is uſually tranſmitted without any other Alteration in the Mouth than being a little roll'd and wrap'd up together. This firſt *Stomach*, which is called the *Rumen*, is the largeſt of them, probably to contain as well the Drink as the whole crude Maſs of their Aliment, which there lie and macerate together, and thence are tranſmitted again to the *Mouth* to be *chew'd* and *comminuted* in order to their further *Digeſtion* in the other *Ventricles*, in which Uſe it perfectly anſwers the *Ingluvies* of *Fowls*.

This Uſe is incomparably illuſtrated by the Structure of the *Rumen* or firſt *Ventricle* of *Camels*, in which are divers *Sacculi* that contain a conſiderable Quantity of Water. This is an admirable Contrivance of Providence to anſwer the Neceſſities of this *Animal*, which living in very dry deſert Places, and feeding upon many Sorts of hard dry Food, ſuch as *Rice*, *Millet*, &c. would very often be in Danger of ſtarving even amidſt the Plenty of dry Meat, which would not digeſt if they had not theſe *Reſervatories* of Water, which oftentimes the Countries thro' which they march does not afford them in a long Tract of Ground; for if the Water

which

which they drink, how large ſoever the Quantity might be, were not kept apart in theſe Receptacles, it would paſs off with the other Aliment upon the firſt Diſcharge of the *Ventricle*, and they would not be able to ſuſtain thoſe long Journeys through dry Places, which all Accounts agree they do for Want of *digeſtible* Food.

Theſe are all the Alterations that occur to be made in the *Mouth*, after which the Food is tranſmitted directly to the Stomach to be digeſted. This Operation we have already denied to be performed by a *Menſtruum* either ſeparated in the *Stomach* or convey'd thither from elſewhere, or by *Attrition* or *ſimple Heat*; tho' we do not deny this latter to contribute to and promote *Digeſtion*, as it ſerves to actuate the Cauſes of *Diſſolution* innate to the *Aliment* it ſelf.

We ſuppoſe then all Sorts of *Aliment* naturally to contain in them a *Principle* of *Diſſolution*, if I may be allow'd to uſe that Term, which after the *vital* and *vegetative Faculty* is extinct begins to exert it ſelf to the Diſſolution or Deſtruction of the Subject; and conſequently the State of Decay may be reckoned to commence, whenſoever the Acceſſion of *new Matter*, or Shifting of the *Fluids*, which in *Plants* as well as *Animals* we call *Circulation*, is at an End; though it does not always immediately ſhew it ſelf in actual viſible Corruption, but proceeds by various Steps or Degrees, according as the *Fluids* or containing Solids are more or leſs diſpoſed to *Activity* or *Reſiſtance*.

This Principle of *Corruption* is perhaps the ſame which in the State of *Circulation* and Vegetation was the Principle of Life, which being an active Principle, and now denied that Paſſage or Vent which it had before by the progreſſive or circulatory Motion, makes its Way irregularly, and ſo deſtroys the Continuity of the Solids in which it is included, and introduces that Change in the Face of the whole Maſs which is called *Corruption*.

The *active Principle* we here mean is the *Air*, which is mix'd in conſiderable Quantity with all Sorts of *Fluids*, and is by Experience found as neceſſary to *Vegetable* as *Animal* Life. This, though its natural or eſſential Motion be expanſive or *quaquaverſum*, being introduced into all Bodies that have any Kind of Life, mix'd with the *Fluids*, which make their Juices, has in them two Kinds of Motion; one *expanſive*, by which it communicates that *inteſtine Motion* which all Juices have, and by which the containing Parts are gradually extended and grow; the other *circulatory* or *progreſſive*, which is not eſſential to it, but is occaſioned by the Renitency of the ſolid Parts of thoſe Bodies, which obliges it to take that Courſe which is moſt open and free, which is through the Veſſels of *Animals* and *Plants*, which Courſe being ſtop'd, the expanſive ſtill remains, and continues to act, till by Degrees it has ſo far overcome the Reſiſtance of the including Bodies, as to bring it ſelf to an equal Degree of Expanſion with the *external Air*, which it cannot do without deſtroying the Texture and Continuity or *ſpecifick* Degree of Coheſion of thoſe *Solids*, which is what is called a *State* of *Corruption*.

For all Bodies, whether *fluid* or *ſolid*, that come within our certain Knowledge, are ſpecifically heavier, and conſequently of a cloſer Texture, than the *Atmoſphere*, and cannot be reduced to a *Par* with it *ſine Interitu Subjecti*. This *expanſive* or *deſtructive* Quality of the *Air* in theſe Bodies may be two Ways actuated or promoted, either by weakening the *Tone* or *Coheſion* of the Parts of the including Body, and ſo facilitating the Work of the *Air*, as it happens when *Fruit* is bruiſed, which will corrupt in that Part much ſooner than in that which is ſound; or by intending the *expanſive* Force of the *Air* it ſelf by *Heat*, or other co-operating Circumſtances, and ſo helping it to overcome the Reſiſtance the ſooner.

Both theſe Ways are uſed in many Kinds of *Animal Digeſtion:* The firſt in *Maſtication*, or the other *Analogous* already ſufficiently ſpoken to: The ſecond by the *Heat* of the *Stomach*, which forcibly rarefying the *Air*, enables it to rend the including Bodies ſooner to Pieces, and ſo to let looſe the *Fluids*, and perhaps likewiſe ſo far to comminute ſeveral Parts of the *Solid*, as to make them ſuſtainable in the Liquor; which latter is the Operation that compleats *Digeſtion* in the *Stomach*. It may perhaps be objected, That the ſame Subſtances which the *Stomach* reſolves ſo quickly into *Particles*, do by every Day's Experience bear a much greater Heat of *culinary Fire*, and for much longer Time, in the

e common Operations of Cookery, Roaſt-g, Boiling and Stewing, than the *Stomach* uires to reſolve them into *Minima*.

To this Objection we anſwer, That this gree of Expedition depends in great Mea-re upon the *Medium* in which it is per-rmed. Thus in *Roaſting* Meat will bear a uch greater *Heat* than either in *Boiling* or *ewing*, and the ſecond Way much fiercer d longer than in the latter; for as *Roaſting* performed in the open *Air*, as the Parts gin externally to warm, they extend and late, and let out gradually Part of the ra-fied included *Air*, by which Means the *ernal Succuſſions* on which this Diſſolution pends are very much weaken'd and aba-d. Boiling being performed in Water, the reſſure is greater, and conſequently the *ccuſſions* to lift up the Weight are propor-onable in Strength, and by this Means the *ction* is haſten'd; and even in this Way ere are great Differences; for the greater Veight of *Water* there is upon the Meat to boiled, the ſooner it is done. And in *ewing*, though the *Heat* be infinitely ſhort what is employ'd in the other Ways of *reſſing*, the Operation is yet much more uick, becauſe it is performed in a pretty loſe Veſſel and full, by which Means the *ccuſſions* are oftner repeated, and more rongly reverberated.

Theſe are the common Obſervations of *ooks*; but there is a Way yet more exactly re-mbling the Operation of the *Stomach*, which by the *Digeſtor* invented by *Monſieur Pa-in*. In this the Meat is put together with o much Water as ſerves exactly to fill the ngine; which done, the *Lid* is skrew'd on loſe, ſo as to admit of no external *Air*, and with two or three lighted *Charcoal*, or a ngle ſmall Lamp Flame, reduced to a per-ect Pulp, or rather a Liquor, in a very few Minutes, as in ſix, eight, ten or ſixteen, ac-ording to the Toughneſs of the Matter to e digeſted, or the Augmentation of this ittle Fire, which will in a very ſhort Time his Way diſſolve the hardeſt Bones them-elves. The ſtrict Cloſure of this Engine, o as to exclude the Intervention or Eſcape f Air, is the Occaſion why the inward *Succuſſions* of the contained Matter, being quable and ſtrong, reſolve the whole into ne ſeemingly *homogeneous* Body, and mix the *aqueous*, *ſaline*, *oleous*, and other Particles, ſo ſtrongly together, as not to be eaſily at leaſt ſeparated; but while hot to appear one Liquor, and when cold an uniform Jelly, of a Strength proportionate to the Quantity of *Fleſh* or *Bones* diſſolved in the Water.

This Experiment holds great *Analogy* with the Operation of the *Stomach*, which, tho' it does not ordinarily diſſolve ſuch hard Bodies, nor others ſo quick, yet according to the Degree of its *Structure*, and the Proportion of its Heat, may be ſaid to do the ſame Thing: For as the *Stomach* naturally cloſes upon the *Aliments* that deſcend into it, ſo it ſtrictly embraces its Contents when full, and by keeping out any extraneous *Air*, fortifies and invigorates the *Succuſſions* of that which is naturally contained in the *Aliment* which it receives; which, however little it may be, is thereby enabled to break and reſolve into ſmall Particles the Bodies which included it ſo mix'd *inter Minima* with its Humours.

Theſe being thus reduced into *Fluor*, and intimately mix'd with the Liquids of the Drink and Juices of the Stomach, compoſe that *lacteſcent Liquor* which is called *Chyle*, which is nothing but a Mixture of *oily* and *aqueous* Parts incorporated together with the *ſaline*, and which, while it remains mix'd with the groſſer Parts in the *Stomach*, makes a thick whitiſh partly *fluid Maſs*, which we call the *Chyme*; which, as ſoon as it is reduced to a Conſiſtence looſe enough to be obedient to the Preſſure and *periſtaltick Motion*, is gradually work'd out through the *Pylorus* into the *Duodenum*, along the Sides of which, and the reſt of the *Inteſtina tenuia*, the *Vaſa lactea* are planted, into whoſe extremely minute Orifices the thinner and more *fluid* Part of this Maſs is preſs'd by the natural Contraction and *periſtaltick Motion* of the Guts, which is that *Chyle* of which the *Blood* is afterwards compoſed, and in Women that give Suck the *Milk* more immediately.

When all the *Chyme* and *Chyle* is preſs'd out, the *Stomach*, which follows the Motions of its Contents, is again by Means of its *muſcular* Coat reduced to a State of Contraction, and by that Means the inner is brought to lie in Folds, which touching, and by Means of the *periſtaltick Motion* rubbing

bing lightly upon one another, produce that gentle Senſe of *Fretting* or *Vellication* which we call *Hunger*; which being felt firſt in the upper Orifice, which is firſt evacuated, begins therefore firſt to prompt us to repleniſh: But as by Degrees the Remainder of the Contents are expelled, this Friction or Rubbing of the Membranes upon each other ſpreads gradually over the whole *Stomach*, and renders our *Hunger* more urgent and impatient, till by a new Repletion we take away the Cauſe.

This is all the *Fermentation* and all the *Menſtruum* that are required to account for all the natural *Phænomena* of *Hunger*, *Digeſtion*, and *Chylification*; and tho' they who admire pompous operous Proceedings, may think it too ſimple a Piece of Mechaniſm for ſuch great Effects, yet it is more ſufficient than any of thoſe magnificent Ways which any of the moſt luxuriant Fancies have been yet able to invent, and is incumber'd with none of thoſe Inconveniencies which have attended all the *Hypotheſes* by different *Menſtrua* and *Fermentations* that I have yet met with: For when any of theſe ſharp provoking Liquors which they have imagined have affected the *Stomach*, as in morbid Caſes they ſometimes do, the *Appetite* has been always vicious, and the Digeſtion bad. For in ſuch Caſes the Repletion with wholeſome Food not being ſufficient to take off the Acrimony of ſuch Humours, the *Fancy* has been upon the *Hunt*, as ſick Fancies generally are for ſomething out of the Way, and perhaps extravagant and hurtful; and when ſuch Humours are ſent in Plenty upon the *Stomach*, they are by the Heat of the Part rarefied into thoſe *Flatulencies* which are vulgarly called *Wind*; which by diſtending the *Stomach* hinder the Folds of the inward *nervous Membrane* from approaching one another, and ſo deſtroy *natural Appetite*, as they do *Digeſtion* likewiſe by hindering the *Stomach* from cloſing exactly upon the Aliments, and ſo obſtructing it in its Office which requires that *Stricture*.

The ſame Way it is that hard Drinking deſtroys *Appetite* and *Digeſtion*; for by keeping the *Stomach* conſtantly diſtended with Liquor, the *Tone* of it is deſtroy'd, and till it can be recover'd again, they never return. We might by the ſame Way account for all the other Diſeaſes of the *Stomach* in which *Appetite* or *Digeſtion* are affected; but to do that, would take up more Room than the Deſigns of this Work allow.

In what Manner the Contraction of the Fibrils of the Heart is performed; as alſo of the contractive Motion of the Muſcles in general. From Mayow, *&c.*

WE have hitherto treated of the moving Particles by which the Contraction of the Muſcles is performed, it remains ſtill to be inquired into after what Manner the Muſcles are contracted by them.

That Way of the Contraction of the Muſcles by the Inflation of the Fibres, which has been aſſerted by ſome, I can't admit of for Reaſons alledg'd before. Unto which we may add alſo, that the Fibrils, which (according to our Opinion) do chiefly ſuffer this Contraction, ſeem to be ſolid Bodies, and conſequently not capable of Inflation.

In reference to the Contraction of the Fibrils, as far as I have been able to learn by Anatomical Obſervations, and my own Conjectures, they ſeem to ſuffer a Contortion in their Contraction. Certain it is, that this Manner of the Contraction of the Fibrils by Contortion is altogether agreeable to the Conſtriction and Hardneſs that is obſerved in the contracted Muſcles. Beſides that, this Contortion of the Fibrils is moſt ſuitable to that ſtrong Traction of the Muſ-

cles

es which ſometimes is made with an almoſt rprizing Violence. Unto this we may d alſo, that the Motion of the nitro-aerious rticles, by which (according to our Opi-on) the muſcular Contraction is effected, ſuch as is moſt ſuitable or adapted to the ontortion of the Muſcles; as may be ſeen ſuppoſe) by the following Experiment: Take a ſmall String, ſuch as they uſe on uſical Inſtruments, and with both your ands at ſome ſmall Space from each other old it ſo near unto a lighted Candle that may be very hot, but not burn; which ne, you will find the ſaid String, as ſoon it begins to be heated by the Candle, to ntract it ſelf very ſenſibly and ſtrongly; hich Contraction of this String is not ef-ted after the common Way, but ſeems as it enter'd upon a ſpontaneous Motion, d contracted it ſelf after the ſame Manner the Fibrils do, being a very delightful ght to behold; and ſo ſoon as the String us contracted is removed from the Can-e, it is very eaſy to be drawn out again to s former Extent or Length.

As to the Cauſe from whence this Con-action of the Muſical String proceeds, we ay be fully perſwaded, that the nitro-erious Particles which break forth from the lame of the Candle produce this Con-action of the String; for we have ſhewn another Place, that all the fiery Particles y which the aforeſaid String is contracted, e nothing elſe than the nitro-aerious Par-cles put in Motion; ſo that this Con-action of the String ſeems to owe its Riſe this, that it ſuffers a Contortion from the itro-aerious Particles. For if you let one nd of the String quite looſe, or keep it on-y looſely betwixt your Fingers as beforeſaid, nd ſo put it near to the lighted Candle, you ill ſee the ſaid String turn round with a wift Motion; *viz.* the nitro-aerious Parti-les that come out of the Candle, and that ith a Motion of Circumrotation, ſuch as proper to their own Nature, entring into he String, do alſo produce there the like Motion of Circumrotation and Contortion.

It ſeems highly probable that the Con-raction of the Fibrils is made very near after he ſame Manner; for the Fibrils, in which he Contraction is chiefly made, ſeem (as far as may be diſcover'd by the Help of a Mi-croſcope) to be very like unto a very ſmall String of a Muſical Inſtrument; ſo that the Contraction of the Fibrils muſt be ſuppos'd to be perform'd by the nitro-aerious Parti-cles put in Motion, and into an Effervеſcency in the Parts that are to be moved.

For if we ſee a rude and thick Muſical String ſuffer a Contraction ſo ſoon as the nitro-aerious Particles do enter it, how much more probable is it that the very ſmall Fi-brils, which are of ſo artificial a Texture, ſhould follow the Motion of the nitro-aerious Particles? Add to this, that when a Muſcle is contracted, it is not to be reduced to its former Extent without ſomething of Violence, juſt as we obſerv'd it before in the Muſical String, which is the Reaſon why in the *Paralyſis* of a Muſcle its Antagoniſt is moſt commonly affected with a *Spaſmus*; for a Muſcle, when once contracted, would certainly remain in that Station or Poſition for ever, were it not for the Traction of its Antagoniſt, by Means of which it is reſtored to its former Length.

From this *Hypotheſis* of ours, we may eaſily account for what is obſerved ſometimes in the Parts to be moved when they are Thun-der-ſtruck, *viz.* That they will be convul-ſive and ſtiff, when at the ſame Time the Skin that ſurrounds the Muſcles is generally not impaired.

For as I have endeavoured to ſhew before, that the nitro-aerious Particles that are in the Brain, not only but alſo in the moveable Parts, are ſometimes as it were ſet on Fire by a Thunder ſtroke; and theſe nitro-aerious Particles being put in a moſt ſwift and Fire-like Motion, do produce ſo violent a Contor-tion and Convulſion in the Fibrils, that they can't extend any more, but will always remain rigid; much after the ſame Manner, as it would happen to the foreſaid Muſical String if it were put too near to the Flame of the Candle.

Of the Motion of the Muſcles *in their Contraction.*

HAving thus far treated of the Man-ner of the muſcular Contraction, it

remains ſtill for us to enter into an Enquiry alſo concerning the Motion of the Muſcles, together with the Parts united to them when they contract themſelves; of which, that you may have the clearer an Idea, take firſt the following Aſſertions.

Firſt then we aſſert, That if a String which is looſe at both Ends ſuffers an equal Contraction, then both its Ends will draw towards the Middle.

Secondly, That in caſe one of the Ends of the Muſical String that is to be contracted is looſe, and the other faſten'd to ſomething, that End not only which is looſe, but alſo all the other Parts of the ſaid String, will be contracted towards that End that is faſt, as may be ſeen in *Fig.* 8. *Tab.* 81. which repreſents a String thus faſten'd and contracted. For in the ſaid Figure not only the looſe End of the String *e.* but alſo the middle Part *a.* and for the ſame Reaſon likewiſe all the other Parts, will be drawn in the Contraction of the String towards its other End *b.* which muſt be ſuppoſed to be fix'd or faſten'd to ſomething. And for the ſame Reaſon, if a greater Weight be put to one End and a leſſer on the other, the leſs Weight will in the Contraction of the String be drawn towards the greater as to a fix'd End.

From what has been ſaid, it will prove no very hard Task to conceive or comprehend the Motion of the Muſcles, and of the abbreviated Fibrils, *viz.* If a Fibre, a Fibril, or a Muſcle, both Ends or Extremities of which are looſe, do contract themſelves, there is not the leaſt Doubt, but that both their Extremities will draw nearer to the Middle: But in caſe one of their Extremities is fix'd to ſome immoveable Part, as it is in thoſe Muſcles that ſerve for local Motions, this Contraction will tend towards the Part that is fix'd; and the moveable Extremity, which is called the *End* in a Muſcle, towards the immoveable Extremity, or, which is the ſame Thing, towards the *Head* of the Muſcle. And the ſame takes Place alſo in the Contractions of the Fibres or of the Fibrils.

I am not ignorant that the Learned Doctor *Willis* (in his Exercitation of muſcular Motion) is of a contrary Opinion, and poſitively denies the Contraction of the Fibres from their End towards their Beginning; but agrees, that when they are ſhorten'd, both their Ends draw towards the Middle: But conſidering that one Extremity of the *Fibre* is fix'd to a Tendon that is immoveable, it ſeems to me, that of Neceſſity the moveable Extremity of the contracted Fibre, as likewiſe its Middle, muſt be drawn towards that Extremity or End that is immoveable, as has been ſhewn juſt now.

Concerning therefore the Contraction of the Fibres, Fibrils, and Muſcles, it is my Opinion, that they do not contract themſelves rather towards their Beginning than towards their Ends out of their own Nature, but for no other Reaſon than becauſe that Extremity which is call'd the Beginning is inſerted into an immoveable Part; ſo that if a Bone into which the *End* of the Muſcle is inſerted does prove more or better fix'd than that wherein its Beginning is faſten'd, then the Muſcle in its Contraction would be drawn towards that End that is thus beſt fix'd. As for Inſtance:

Take hold with one of your Hands of ſomething that is immoveable, ſo as to cauſe a ſtrong Contraction in the Muſcles that bend the Cubit, (which may be effected if you endeavour to pull the Thing you have taken hold of towards you with your utmoſt Strength;) in this Caſe I ſay, ſince the Thing that is taken hold of, being immoveable, can't be pull'd to him that draws or pulls, the aforeſaid Muſcles, which in their Contraction attract the Arm, will alſo draw the whole Body that adheres to it towards the Thing that was taken hold of; ſo that theſe Muſcles in their Contraction happen to be drawn towards their End, and not to their Beginning, becauſe the *Os Cubiti*, into which the Ends of the aforeſaid Muſcles are inſerted, is now the End that is moſt fix'd or faſten'd, becauſe the Thing that is taken hold of is immoveable; as may be ſeen in the 16th *Figure* of *Tab.* 81. in which, whilſt the Muſcles that bend the Cubit, *a*, *c.* are contracting themſelves, theſe don't bend the Cubit as they uſed to do, but the Arm; ſo that when the ſame are contracted, *b*, *c.* they are drawn towards the End *c.*

As to what relates to the Motions of the *Sphincters*, as alſo of the membranous Bodies, *viz.* the Motion of which is terminated within themſelves, theſe are in their Contraction drawn towards the Center of that Part which they incloſe.

CHAP. VII.

Of the Contraction of the Septum tranſverſum; *of the Pulſation of the* Heart, *as alſo of its Palpitation; and of the Motion of the Animals when they ariſe upwards.*

IN the preceding Chapter we have ſpoken concerning the Motion of the Muſcles when they contract themſelves in general, and of the Muſcles deſigned for the Inſtion of the Parts in particular. The next thing that is now to fall under our Conſideration is, in what Manner the *Diaphragma* is moved in its Contraction, as alſo how the Pulſation of the Heart comes to paſs; and laſtly, how the Muſcles intended for the Extenſion of the Parts do contract themſelves, which Contraction produces what we call Leaping.

In relation eſpecially to the Contraction of the *Septum tranſverſum*, though we have treated of it in our Treatiſe of Reſpiration, publiſhed ſome Time ago, it will nevertheleſs be requiſite to add ſome Things to it in this Place.

And here the firſt Thing I aſſert is, that whenever a ſinuous or concave Surface, the Circumference of which is faſten'd to ſome immoveable Part, ſuffers a Contraction, it will every where be drawn towards the immoveable Part, and the concave Surface will approach towards the Plan, but never beyond it; as may be ſeen in *Fig. 9. Tab.* 81. in which let the ſinuous Surface be *b*, *a*, *c*. the Ends *b*, *c*. of which are fix'd, when it is contracted, it will be drawn towards the Plan *b*, *c*, *c*. Now let the Surface be contracted *b*, *d*, *c*. its Middle *d*. I ſay, does approach nearer to the Ends *b*. and *c*. as the Middle of the Surface that is not contracted *a*. However, this Surface, even when contracted, will never go beyond the Plan *b*, *c*. becauſe the Line *b*, *c*, *c*. is the ſhorteſt betwixt the Ends *b*, *c*.

According to this Poſition, we aſſert, that the *Septum tranſverſum* in its Contraction is carried towards a Plan, and that in its Conſtriction it tends towards the Cavity of the *Abdomen*, *i. e.* downwards and outwards; for it is apparent by Anatomical Obſervations, that the Figure of the *Septum tranſverſum* is *ſinuous*, ſo that its *concave* Surface or *Sinus* looks towards the *Hypochondria*.

Now it being certain that every concave Surface is moved in its Contraction towards a Plan, *i. e.* towards that Part to which its concave Surface looks; and ſince the Parts of the *Abdomen* unto which the concave Surface of the *Septum tranſverſum* is turned, are in reſpect to the *Septum* placed in the inferior and exterior Part, whilſt the *Septum tranſverſum* is in its Contraction drawn towards them, it muſt of Neceſſity follow, that when it is contracted, it goes downwards and outwards; which is conſonant alſo to the Obſervations made in the Diſſections of living Creatures.

And here I can't but admire what could move the Learned *Willis* to aſſert in his Anſwer to Dr. *Highmore*, 'That the *Septum* '*tranſverſum* did ſometimes, *viz.* in great 'and ſtrong Inſpirations, ſuch as he ſup-'poſes to happen in dying Perſons, does 'deſcend below the Plan, and become very 'convex towards the Inteſtines.

This ſeems to carry but little Probability along with it; nay, I do not ſee any Poſſibility how this Deſcenſion of the *Septum tranſverſum*, occaſioned by the Lungs, and a longer Inſpiration, ſhould come about as this Learned Man would have it, ſince the Inſpiration and Intumeſcency of the Lungs is brought about by the Deſcenſion of the *Diaphragm* and the Dilatation of the Breaſt; whereas the Lungs never make the *Septum tranſverſum* to deſcend, but follow its Mo-

tion; as has been ſhewn by us likewiſe in another Place. But the *Septum tranſverſum*, when it contracts it ſelf, is reduced to a Plan, and never recedes from it; as is manifeſt from what has been ſaid juſt now.

It can't indeed be denied, but that ſometimes in the Wounds of the Breaſt, or of the *Septum tranſverſum*, the *Diaphragm* will be made uneven towards the inferior Parts; but this does not proceed from the Inſpiration, nor from the Lungs, and their long Inſpiration, but happens only in the Contraction of the Breaſt, and in Expiration: *viz.*

In the Dilatation of the Breaſt, where there is an Aperture made by the Wound, the Air enters partly by the *Trachæa* into the Lungs, and partly thro' the Orifice of the Wound into the Cavity of the Breaſt by its elaſtick Force. Now when in Expiration the Space of the *Thorax* is ſtraighten'd on a ſudden, the Air which is incloſed in that Cavity that is betwixt the Lungs and the interior Side of the Breaſt, not being able to make its Paſſage immediately out of the Aperture of the Wound, and at the ſame Time ſuffering a Compreſſion by the Contraction of the Breaſt, does protrude the *Septum tranſverſum*, which is then already in a *Diaſtole* and relaxed, and preſſing it downwards, produces its Convexity; as I can teſtify it by my own ocular Experience in the Diſſections of living Creatures.

'Tis further obſervable in relation to the *Septum tranſverſum*, that the fleſhy Fibres taking their Riſe from its membranous middle Part, do divaricate all round about from thence into thoſe Parts into which it is inſerted: Hence it is, that whilſt ſome of the Fibres are extended from one Part, and others of the contrary Side, and cauſe an equal Endeavour towards a Conſtriction, the intermediate Membrane is kept in an equal Ballance; but in the mean while the *Diaphragma* is carried downwards and outwards no otherwiſe than if it had its Fibres extended according to its whole Length.

Of the Pulſation of the Heart.

AS to what relates to the Contraction of the Heart, the moſt Ingenious Dr. *Lower* has given ſo exact a Deſcription of its Motion and Structure, that ſcarce any Thing can be added to it. That the Heart is actually a Muſcle, and that its Fibres when contracted do draw together or ſtraighten its Ventricles, and thus expel the Blood, is what is manifeſt beyond all Contradiction.

But there is nevertheleſs a certain difficult Point to be ſolv'd, *viz.* How, ſince the Heart in its *Syſtole* ſuffers a Conſtriction and is ſtraighten'd, it comes to paſs that at the ſame Time it ſtrikes againſt the left Side of the Breaſt? For it ſeems as if the Heart in its Contraction did rather go inwards, and recede further from the Breaſt.

'Tis upon this Account that ſome are apt to imagine, that it is not the Heart it ſelf, but the great Artery, which when diſtended with the Blood ſtrikes againſt the Breaſt. But the great Artery immediately after its Origination is carried backwards toward the Spine, ſo that its Pulſation can't be perceiv'd on the Outſide. Neither muſt we imagine, that the *Auriculæ* of the Heart are what in their Contraction ſtrike againſt the Breaſt, becauſe theſe, as well as the Heart it ſelf, are contracted ſtraighter together in their *Syſtole*; beſides, that their Situation, which is ſomewhat deep, is not ſo well adapted for ſtriking againſt the Breaſt.

Neither ought it to be imagined, that the Tip of the Heart does by its Vibration and *Subſaltus* ſtrike againſt the *Thorax*, and produce a Pulſation there; becauſe I my ſelf have made this Obſervation in the Diſſections of living Animals, that the Pulſation of the Heart proceeds from its Ventricles being raiſed up into a Tumour: For if you open the *Thorax* of a Dog with all poſſible Diſpatch, and put your Finger or Hand upon the left Ventricle of the Heart while it is in its *Syſtole*, you will ſee the ſaid Ventricle to tumefy with a Kind of a Leap, and ſtrike very ſtrongly againſt your Fingers or Hand that have been laid upon it. Nay, if you put your Finger at ſome Diſtance from the left Ventricle whilſt the Heart is contracting it ſelf, you will find the Side of the ſame Ventricle to ſtrike hard againſt your Finger; and that this happens thus, has been long ago obſerved by *Harvey* and *Lower*, our Countrymen.

The

The Ingenious Dr. *Harvey* is of Opinion, that this Pulſation of the Heart owes its Origine to this, that whilſt the Sides of the Ventricles are contracted in Length, they muſt of Neceſſity increaſe in Thickneſs, juſt as it happens to the reſt of the Muſcles, which when contracted ſwell or grow bigger in Breadth.

'Tis true, I muſt confeſs, that the Sides of the Ventricles of the Heart do increaſe a little in Thickneſs in their Contraction; but it ſeems not very probable that they do ſwell up to ſuch a Bigneſs as is required for the Pulſation againſt the Breaſt, it having been found of late, that the Muſcles in their Contraction do not ſwell up ſo much as has been generally believed they did.

'Tis therefore my Opinion in relation to the Pulſation of the Heart, *viz.* That in the Conſtriction of the Fibres of the Heart they draw its *Cone* towards its *Baſis*, this being the End or Extremity which is moſt fix'd and firm; whence it is, that the Sides of the Ventricles (with the Concurrence of the Preſſure of the Blood contained within) muſt be puſhed or carried outwards.

And here it is obvious to object with the moſt Ingenious Dr. *Harvey*, *viz.* That a circular Fibre in its Contraction will tend towards a right Line, but not towards a Circle; and that the Ventricles of the Heart being in a circular Poſition, they muſt of Neceſſity be drawn not outwards, but inwards towards a ſtraight Line.

But unto this it is anſwer'd, That if both the Extremities of a circular Fibre are fix'd or faſten'd to ſomething, then it will, when it is ſhorten'd, be carried towards a ſtraight Poſition: But in caſe one of the Ends of the ſaid Fibre is moveable, and actually in Motion, then it may be diſtended circularly in its Contraction. As for Inſtance:

In *Fig.* 13. *Tab.* 81. let *a*, *i*, *b*. be the circular Fibre or the interior Side of the left Ventricle of the Heart, and *a*, *e*. the *Septum* or Partition of the Heart; ſince (I ſay) in the Contraction of the Side *a*, *b*. one of its Ends *b*. *viz.* the *Cone* of the Heart, by reaſon of the *Septum a*, *e*. which is contracted alſo, does tend or bend towards *e*. that Side will by reaſon of its Contraction be carried outwards near *d*. and will make the Line *a*, *d*, *e*. which though it be ſhorter than the Line *a*, *i*, *b*. yet will it riſe into a Tumour near *d*.

Towards the Motion of that Side the Impulſe of the Blood does alſo contribute a conſiderable Share; for this ſuffering a ſtrong Compreſſion by the Contraction of the Heart, and yet not being all protruded at once into the great Artery, it ſtrikes with an Impetuoſity againſt the Side of the Ventricle.

Here ariſes another Queſtion, *viz.* How the Blood, that is contained within that Part of the Ventricle where the Contact is, is expelled? For it is not to be imagined, that in the *Syſtole* of the Heart the lowermoſt Part of the Heart does come cloſe to the *Baſis*, but that there is ſome Space or Interval left betwixt them.

Unto this it is anſwer'd, That it is uncertain as yet whether all the Blood does break forth every where from the contracted Ventricles; and it ſeems, that when the Ventricles of the Heart are depleniſhed in a Manner or very near of all the Blood, the Remainder of the Blood can't be ſo cloſely or with ſo ſufficient Force compreſs'd by them, as is required for the Protruſion of the Blood to its Extremities.

But if it be ſuppoſed that all the Blood is expelled from the Ventricles of the Heart, we muſt imagine that the Sides of the Ventricles do continue their Contraction for ſome Time after that firſt impetuous Impulſe which produces its Pulſation; for it is next to an Impoſſibility to conceive how, without ſuch a Continuation, all the Blood ſhould by one Pulſation of a Moment be propelled into the great Artery.

Add to this, that in the Hearts of Animals when at the Point of Death, it has been found in Anatomical Diſſections, that the Motion of Contraction is not made at one Stroak as it were, but that it begins in the *Septum*, and after that is gradually propagated in the *Latera* or Sides of the *Ventricles*; *viz.* in order to ſet the Blood firſt in Motion, there is a much greater Contraction, and a Shock or *Subſultus* required; whereas a much leſs Degree of a Conſtriction of the Ventricles is ſufficient for its Continuation.

For

For the farther Expulſion of the Blood out of the Heart, its *Septum* and *Ventricles* are not only contracted in their Length, but in their Breadth alſo; for thoſe *Scrobiculi* or Pits, which make up the Cavity of the Heart, have ſuch a Poſition as are altogether adapted to the Heart when in a State of Conſtriction in all its Parts, as Doctor *Lower* has very well obſerved. Add unto this, that the Fibres of the Heart are annex'd all round about unto the Orifice of the Artery; whence it is, that when they are contracted they muſt diſtend the Sides of the Orifices on all Sides, and conſequently open a free Paſſage for the Blood to diſcharge it ſelf after its firſt Eruption.

Neither muſt it be paſs'd by in Silence here, that the *Septum* of the Heart is not extended ſtreight lengthways, but plac'd in an obique Poſition, ſo that towards the Right Side it is ſomewhat raiſed or convex; but where it looks towards the Left Ventricle it is concave, or at leaſt even, as you ſee it repreſented in *Fig.* 13. *Tab.* 81.

This Figure or Poſition of the *Septum* does not a little conduce towards the Ejaculation of the Blood with the greater Force out of the Left Ventricle of the Heart into the moſt extream Parts of the Body; for by the Conſtriction of the Side of the Right Ventricle, the Blood which ſuffers a Compreſſion by it, is forced againſt the convex Side of the *Septum*; and the *Septum* being in a Conſtriction, by its own Strength is tending towards a ſtreight Line, and ſo produces ſtill a greater Coarctation in the Left Ventricle, as may be ſeen in *Fig* 13. *Tab.* 81. ſo that even the Force of the Right Ventricle's Conſtriction does contribute not a little towards the aforeſaid Contraction of the Left Ventricle.

'Tis farther obſervable, that whilſt the *Septum* in its Contraction is thus drawn towards a Plan, almoſt the whole Heart is carried towards the Left Side, as is to be ſeen in the foreſaid Figure.

Now conſidering that the Heart, after it is once put in Motion, does, according to the Nature of all Things that are projected, continue for ſome Time in that Motion; hence it is, that when it is carried towards the Left, it ſtrikes with ſome Force againſt the Left Side of the Breaſt; tho' after all I think, that the Thickneſs of the Side of the Left *Ventricle*, which exceeds that of the other, its ſtronger Pulſation, as likewiſe its Figure, which is very different from that of the right *Ventricle*, do not a little contribute to this Pulſation. Unto which it may be added alſo, that the ſpiral Fibres are diſpoſed after ſuch a Manner in the Walls or Sides of the Left Ventricle, that by any ſtrong Conſtriction of theirs, the Heart is contorted ſo as that its Right Ventricle is bent a little backwards towards the Spine, and its Left forwards towards the Breaſt, where it ſtrikes againſt it.

From what has been ſaid it follows, that when the Paſſage of the Blood out of the Ventricles of the Heart is interrupted by ſome Obſtruction, either in the ſanguiferous Veſſels of the Lungs, or elſe of the great Artery, it muſt of Neceſſity happen, that whilſt the Heart does forcibly contract it ſelf, to diſcharge it ſelf as much as poſſibly it can of the Blood, the Sides of the *Ventricles* are by the Blood detained within diſtended into a circular Figure; whence it is that the Heart does ſtrike with Violence againſt the *Thorax*, and that to ſuch Degree at certain Times, that the very Ribs are protruded outwards by the ſaid exceſſive Diverberations.

So that it is here we muſt look for the Cauſe of the Palpitations or Leapings of the Heart, eſpecially of ſuch as are of any long Continuance; for in this Affection, tho' the Pulſation of the Heart is very violent, yet the Pulſe of the Arteries is commonly very ſlender in the Wriſts; as has been found frequently both by others and my own Obſervations.

Unto this may be added and referred unto likewiſe, that when the Bodies of ſuch Perſons as have dy'd of the Palpitation of the Heart have been open'd, ſometimes the ſanguiferous Veſſels of the Lungs, ſometimes the great Artery, have been found obſtructed, or perhaps quite ſtop'd up, either with ſome cartilaginous Body growing to it, or by ſome coagulated Blood; and one of the *Ventricles* of the Heart much diſtended by ſome grumous Blood.

For

For the better Satisfaction of the Reader in relation to what has been ſaid upon this Head, we will inſert here what has been obſerved by the learned and moſt ingenious Doctor *Tho. Millington*, and communicated to me not long ago by him, relating to this Affection, and is as follows:

A young Gentleman of about 20 Years of Age, of a lean and very tender Conſtitution of Body, had been affected for ſome Years paſt with a Palpitation of the Heart, which was ſo violent, that the Ribs were thruſt outwards by the Pulſation of the Heart againſt them, and there appear'd a very conſiderable Swelling on the Left Side of his Breaſt, unto which if you laid your Hand, you might have felt the Heart ſtriking with Violence againſt the *Thorax* in ſuch a Manner, that it ſeem'd as if you might graſp it with your Hand. All this while the Pulſe in the Arteries of the Wriſts was very low. That theſe Things were thus far actually obſervable in this Patient, after the ſame Manner as they have been related, I am able to teſtify my ſelf.

Beſides this, the Patient, whenever he did run or move faſter than ordinary, was ſhort breathed, and affected with a moſt violent Palpitation of the Heart, and was almoſt ready to fall into a Swoon for Want of Spirits.

At laſt, after having travell'd a great Way in a Coach, he was ſeized with a more violent Paroxyſm, attended with frequent ſwooning Fits, and a Coldneſs in its Extremities or Limbs, and ſo died.

His Body being open'd, the Heart was found very much ſwell'd, but more eſpecially its Right Ventricle, which was bigger than ordinary, and turgid with coagulated Blood; beſides, that its muſcular Side was very robuſt and thick. Beſides this, the Pulmonary Artery and Vein were diſtended with a grumous Blood; and the Vein, whereby it diſcharged it ſelf into the Left Ventricle of the Heart, was almoſt cloſed up by a Cartilage that was grown to the Inſide of it, ſo that the Blood could ſcarce penetrate into that *Ventricle*.

And that this Obſtruction of the *Vena Pulmonalis* was not only the Cauſe of the Palpitation of the Heart, but of all the beforeſaid *Phænomena* wherewith this Patient was afflicted, is, I think, beyond all Diſpute.

For conſidering that the Blood could not by reaſon of this Obſtruction enter into the Left *Ventricle* of the Heart, there was a Neceſſity for the ſanguiferous Veſſels of the Lungs, and the Right Ventricle of the Heart being diſtended by the Blood; and there was alſo no leſs a Neceſſity for a violent Conſtriction of the Heart, but more eſpecially of the ſaid Ventricle, in order to propel this Blood as much as poſſibly could be through the Lungs into the Left *Ventricle* of the Heart.

This was the Reaſon alſo why the Side of the Right *Ventricle* proved ſo ſtrong and thick, becauſe all Muſcles will increaſe in Bulk above the reſt by violent Exerciſe.

The Reaſon why the Heart ſhould ſtrike with its violent Pulſation againſt the Left Side of the Breaſt, whereas the Tumefaction appeared only in the Right Ventricle of the Heart, muſt be accounted for thus; *viz.* Conſidering that all the Blood could not be expell'd out of the Right *Ventricle*, by reaſon of the foreſaid Obſtruction, and ſuffering a very violent Compreſſion by the violent Conſtriction of the muſcular Side of the Ventricle, the *Septum* of the Heart, and conſequently alſo the Heart it ſelf, was propelled towards the Left Side, as has been ſhewn before.

But here it is to be obſerved by the by, that the Palpitation of the Heart, which comes on a ſudden and unforeſeen, may owe its Cauſe alſo to this, That upon any overheating of the Blood, when it is put into too violent a Motion, it ruſhes with too rapid a Current into the Ventricles of the Heart; ſo that the Heart is under a Neceſſity for the Expulſion and Diſcharge of this extraordinary Affluence of the Blood, to make alſo a more extraordinary Conſtriction.

It ought alſo to be remember'd in this Place, that the Heart, as well as all the other Muſcles, being ſubject to convulſive Motions, its Palpitation may ſometimes be attributed alſo to that Cauſe.

But as to what relates to the Difficulty of Reſpiration, wherewith this Patient uſed to be affected at all Times upon any extraordi-

nary

nary Motion or Exercise, this must be deduced from thence, that the Blood which by the Contraction of the Muscles was carried with a more plentiful Stream to the Right *Ventricle* of the Heart, found it self interrupted in its free Course through the Lungs, and into the Left Ventricle of the Heart.

By saying this, I would nevertheless not be understood thus; as if it were my Opinion, that the Blood detained in the Lungs did so far stop them up as not to afford a free Passage to the Air: For let the sanguiferous Vessels of the Lungs be never so much distended with Blood or any other Liquid, the Lungs themselves will never swell bigger; but nevertheless are expanded or extended by the Air that is drawn into them, and when that is gone again, they soon decrease again.

This every one may be convinc'd of, by making an Experiment in the dead Body of any Animal, by conveying some Blood or other Liquor into the *Vena Pulmonalis*, after a Ligature made upon the *Arteria Pulmonalis*, and then blowing the Air into the Lungs by the Help of a Pair of Bellows apply'd to the *Aspera Arteria*.

But whenever the Blood does stagnate in the Vessels of the Lungs, the Patient will be the same as if Respiration were suppress'd, for there are chiefly two Things proceeding from Respiration:

First to convey the Mass of Blood through the Lungs into the Left Ventricle of the Heart; (tho' this is not so much owing to the Motion of the Lungs as to the nitro-aerious Particles, which being intermix'd with the Blood by Respiration, ferment the Blood, and keep it from coagulating, as has been shewn elsewhere.) And therefore if the Blood does upon any Account or Reason stagnate in the Lungs, as it happen'd in the before-mentioned Case, the Patient labours immediately under Difficulty of Breathing, and is in a Manner suffocated.

The *Second* Effect of Respiration is, that the nitro-aerious Particles may be together with the Blood carried in a sufficient Quantity to the Brain, in order to give a fresh Supply of the animal Spirits, which unless it be done in due Measure and Order, the Second Respiration of the Brain being suppress'd, there will soon ensue a great Defect of the Spirits, and frequent Swoonings.

In what Manner the Action of Leaping is perform'd.

BY Way of *Appendix*, we will add something here also concerning that Motion, by which the Animals do raise themselves altogether from the Ground in Leaping.

This Motion, according to the most ingenious Doctor *Willis*, is not owing to the Contraction of the Muscles, but rather proceeds from some elastick Vertue; for these are the Words of this learned Man in his Answer to Doctor *Highmore*.

'In case there were no other Attraction 'but to the Part that is immoveable, How 'would it be possible for an Animal to 'move it self altogether, and to lift it self 'at once from the Ground, for the Motion 'of the Whole does follow the Motion of 'each of the moving Parts; and therefore 'if these can only be drawn one to another, 'and can lift themselves wholly up, without any elastick Vertue, I am then willing 'to own, that I am not able to comprehend 'by what Means, and by what Contrivances, an Animal can raise it self up 'from the Ground, and leap up and down 'from Place to Place.

But for my Part I am as little able to comprehend what this learned Man means by the elastick Vertue of the Organs; neither do I see any Reason why we should have Recourse to it, since that Motion of the Animals by which they may raise themselves from the Ground, may be very conveniently made by the Contraction of the extending Muscles; as will be apparent from what follows.

Let, in the *Fig.* 10. *Tab.* 81. there be a Stick, *a*, *b*, which must be suppos'd to be turn'd round its Center *a*; now I say, that every Part of this Stick thus turn'd round, *viz.* *c*, *b*, will be ready to decline as much as in them lies from the Centers of the Circles describ'd by themselves, and will move towards the streight Lines *c e*, and *b e*; for here the Thing is the same as what may be ob-

bſerv'd in a Stone turn'd about in a Sling, which is inclin'd always to ſlip out of the ling, and to enter upon its Motion in a reight Line, as it has been long ago oberv'd by the moſt ingenious Monſieur *Des Cartes.*

Now let us ſuppoſe the ſame Stick that is urn'd round, whilſt plac'd in an horizontal ituation, to be looſe from its Center *a*, ou will then find him not to go on in a ircular Motion, but to aſcend directly upwards.

Now this being granted, let, as in *Fig.* 2. *Tab.* 81. *a*, *e*, be the *Os Tibiæ*, and *n*, the *Os Cruris*, and *e*, *b*, *c*, the *Muſculi Extenſores Tibiæ*; now when theſe are contracted, and the Animal put beforehand in convenient Poſition for Leaping, the *Os ruris*, *c*, *n*, will be turn'd round the Protuerancy of the *Os Tibiæ* near *e*, in the ſame Manner as the beforeſaid Stick round its Center.

So that the *Os Cruris*, or Thigh-Bone, hen thus turn'd round and tending to ove upwards, if it be turn'd about with ſufficient Impulſe or Strength by the foreaid Muſcles, this Endeavour will take ffect, and the Thigh Bone will pull the *Os Tibiæ* along with it upwards. In the ame Manner it is with the *Muſculi Extenres* of the Foot, Back, *&c.* by the ſtrong ontraction of which, the Parts into which hey are inſerted are turn'd round and carıed upwards.

Thus you may ſee in *Fig.* 12. *Tab.* 81. hich repreſents to you the Muſcles Extenors of the Foot, Leg, Thigh and Back, toether with the Bones into which they have heir Inſertions. The Reaſon why we have n the ſame Figure given you a Delineation lſo of the bending Muſcles of the Arm, Cubit nd Hand, is, becauſe theſe Muſcles alſo conribute their Share towards this Elevation of ur whole Body; *viz.* as far as they, being iolently contracted, do pull with ſome orce the Parts annex'd unto them upwards, s every one may find in himſelf when he oes to leap.

But here it is to be obſerv'd, that the beoreſaid Bones, together with the Parts anex'd unto them, are not by the Contraction f the ſaid Muſcles pull'd directly upwards, but that the Parts belonging to the Thigh are raiſed upwards and forwards, and the Parts of the Back on the contrary upwards and backwards, as may be ſeen in the foreſaid Figure. This muſt however be taken thus; that in the Motion of the Animals, which raiſe themſelves directly upwards, the ſame Force or Impulſe by which ſome Parts are tending forwards, and that by which the reſt are carried backwards, being fix'd in an *Equilibrium*, do mutually check each other; and in the mean while diminiſhes the other Motion, by which all the Parts are raiſed upwards, and according as the Animals leap forwards or backwards, this Force, which draws ſome of the Parts forwards, and others backwards, muſt be the moſt prevalent.

But to give you ſtill a more clear Idea of the Matter, I ſay that the beforeſaid *Muſculi Extenſores* do, by the Means of their Contraction, raiſe the Animal upwards, altogether after the ſame Manner as we ſee a Thing thrown out of our Hands to a Diſtance.

Now concerning the Force or Impreſſion made upon thoſe Things that are thrown to a Diſtance, we can't have any other Conception or Notion of it, than that it is one only Motion, into which after a Thing is once put, it will continue in the ſame for ever, till ſuch Time that it is ſtop'd either by ſome Bodies that light or are in its Way, or elſe by its innate Gravity.

For in the ſame Manner (as the Great *Des Cartes* has very well obſerv'd) as when a Thing is in a State of Reſt, we don't in the leaſt imagine that it will ever begin to move, unleſs there be ſome Impulſion or Impreſſion made upon it by ſome Cauſe or other; ſo there is not the leaſt Reaſon to believe, that a Thing that is in Motion ſhould ever ceaſe or intermit its Motion of its own Accord, unleſs prevented by ſome Thing that is in its Way.

For conſidering that inanimate Beings are not in a Capacity to diſpoſe of themſelves, but are ſubject to the Diſpoſal of others, there is a Neceſſity for their continuing in the ſame State in which they are plac'd for ever, until that State is alter'd by ſome external Cauſe or other.

Concerning that Impulſe or Impreſſion made upon a Stone caſt out of a Sling, or a Bullet ſhot out of a Gun, we can frame no other Notion of them, than to be a moſt ſwift Motion, by which the Things that are thrown, or caſt out, are under ſuch a Conſtitution when they come forth out of the Sling, or out of the Gun.

To give you an Inſtance in relation to what has been ſaid upon this Head: Let us ſuppoſe a *Pendulum* that is let down out of any Point of a Circle; whilſt this does deſcend to the lowermoſt Part of the Circle, it does not reſt there, but will aſcend to the End of the Circle, very near at the ſame Height oppoſite to the other. Now pray what is it that makes the *Pendulum* to aſcend thus? For as to the Gravity, that is unable to produce an Aſcent in its own Nature, which on the contrary endeavours to make Things deſcend; and yet at the ſame Time in this Caſe the Gravity of the Pendulum is the real Cauſe which makes it aſcend; *viz.* in ſo far as the *Pendulum*, when brought to the lowermoſt Point of the Circle, by the continued Impulſe of its Gravity, has acquired ſo quick a Motion, that it is able to raiſe it ſelf upwards; for the higher the Point in Place is from whence the *Pendulum* is let down, the higher it will riſe again at the oppoſite Part; which happens for no other Reaſon, but that the *Pendulum* being fallen down from a higher Place, has in the lowermoſt Point of the Circle obtained a much more ſwift Motion, and conſequently alſo a much ſtronger Impulſe or Impreſſion.

It happens altogether after the ſame Manner with a Bullet when it comes out of a Gun that is pretty long, by which it acquires a very quick Motion, and conſequently alſo a very ſtrong Impreſſion or Impulſe.

For the quick Motion, or the Impulſe and Impreſſion made upon a Stone thrown or falling from off a high Place, or of a Bullet ſhot out of a long Gun, are increaſed by one and the ſame Cauſe; *viz.* becauſe whilſt the Stone is deſcending, or the Bullet paſſes through the Barrel of the Gun, the Impulſe of Gravity, or of the impelling Force, is removed at each Inſtant.

But to come to the Application of what has been ſaid juſt to the preſent Queſtion: When an Animal bends it ſelf, in order to put it ſelf into a proper Poſition for Leaping, (for we ſee that when an Animal is to leap, or raiſe it ſelf upwards, it muſt of Neceſſity bend or inflect it ſelf firſt) then the Muſcles that extend the Members do all in general enter into a very violent Conſtriction; whence it is, that all the Parts of the Animal are carried upwards, as is evident from what has been ſaid above.

And as all the Parts of the Animal, and conſequently alſo the Animal it ſelf, are by the foreſaid Muſcles put into a Motion to riſe upwards, theſe Muſcles do by the ſame Manner raiſe the Animal on high or upwards, as Things that are thrown out are moved ſomewhere or other; for the Impreſſion made upon Things projected, is nothing elſe than a Motion towards ſome certain determinated Place, towards which a certain Thing is caſt by ſome impelling Cauſe.

Of Voluntary Motion, *according to the* Syſtem *of* Borellus, Willis, Gliſſon, Harvey, *and others. Taken from Doctor* Charlton's *Enquiries into Humane Nature.*

IN this illuminated Age of Experimental Philoſophy, and Anatomick Knowledge, there have been many, who laying aſide that *antique Hypotheſis* of *Animal Spirits*, as both improbable and unneceſſary, hold it to be ſufficient to ſolve all the *Phænomena* of Voluntary Motion, if it be ſuppos'd that the Dictates of the Soul are tranſmitted from the Brain to the Nerve and Muſcle to be us'd, not by Emiſſion of any Subſtance whatſoever, but by a meer Contraction of ſuch *Fibres* of the Brain as are continued to them, at the other inſerted into the Head of the Muſcle, ſo as to make one continued Cord all along; if a Motion be excited *ad Nutum Animæ* in the Fibres of the Brain, the ſame muſt be at the ſame time excited in the Nerve alſo and the Muſcle, by reaſon of their *Continuity*.

The Ancients, 'tis well known, unanimouſly taught, that the Soul effects Motion in the Muſcles at Pleaſure, by tranſmitting from the Brain, by the Nerves, into them a certain moſt thin, moſt ſubtil, and moſt agil Subſtance, which they call therefore *Animal Spirits*, by whoſe ſwift and copious influx the Muſcles to be moved being in an inſtant as it were inflated and diſtended *ſecundum Latitudinem*, they are forced to contract or ſhorten themſelves *ſecundum Longitudinem*, and by that Contraction to pull and move the Members to which they are faſten'd. And this Opinion hath been without any Diſpute embrac'd and aſſerted through a long Train of Ages down to this in which we live.

Betwixt theſe two ſo different and irreconcileable Opinions, I am forced to ſuſpend my Judgment, ſays my Author, not yet being able to diſcern which hath the Advantage above the other in Point of *Veriſimilitude*. To reject either of them as *erroneous*, would hardly conſiſt with the Rules of a Philoſopher, who ought to weigh *Truth* as in a Ballance. There remains nothing then but to examine both, and after the Arguments are produc'd on both Sides, to give Sentence which of the two Opinions is the more probable. Out of Deference to Antiquity, we ſhall begin with the Opinion of the Ancients, and firſt of all defend the *Hypotheſis* of *Animal Spirits*.

In the firſt Place therefore, ſeeing every Inſtrument ought to be accommodated both to the Nature and Force of the Agent that is to uſe it, ſo as to hold ſome Proportion to the Energy of the one, and to the Conditions of the other; and ſeeing that *Voluntary Motion* is commanded and executed in one and the ſame Moment of Time, with Velocity equal to that of Lightning: Conſidering this, it ſeems neceſſary that the Inſtrument upon which the Soul immediately impreſſes her Power, ſhould be ſuch as is naturally fit to convey the ſame from the Brain, by the Nerves, into the Muſcles, *tanquam in inſtanti*, and moſt eaſily. But in the whole Body nothing is found ſo eaſily and ſwiftly moveable, as that moſt ſubtle and meteoris'd Subſtance of which the *Spirits Animal* are ſuppos'd to conſiſt; and therefore it is conſentaneous that they are the immediate Inſtrument of the Soul in Voluntary Motion.

Here it may be objected, That although theſe *Spirits* be ſuppos'd to conſiſt of Matter the moſt refin'd and moſt agile imaginable, more ſubtile than the Particles of Light,

or *Des Cartes*'s *Materia Subtilis*; yet ſtill they muſt be Bodies, and therefore can hold no conceivable Proportion to the *Soul*, which is believed to be *Incorporeal or Immaterial*. But tho' this Objection lies heavy on this Doctrine, it ſeems not to be much reliev'd upon the other *Hypotheſis*, of the *Muſcles* being mov'd by the *Nerves* excited or invigorated at their Original by Motion begun in the Fibres of the Brain by the Soul.

Secondly, It is evident that the motive Power of which we are ſpeaking, is not inherent in the Muſcles themſelves, nor in the Nerves inſerted into them, but deriv'd and emitted into them from the Brain *ad Nutum Animæ*, as ſhe has Occaſion to uſe them. If ſo, what Notion can we have for ſuch a Power, unleſs we conceive it to be a certain Invigoration or Force ſuddenly communicated to, or impreſs'd upon the Fibres of the *Muſcles*? And wherein that Invigoration's to conſiſt, if not in a Diſtention of thoſe Fibres, by ſome Influx from the Brain?

Thirdly, If there be no invigorating Influx from the Brain through the Nerves, How comes it that an Obſtruction or Compreſſion, of any one of them, forthwith cauſes a *Palſey* in that Part to which the obſtructed or compreſs'd Nerve belongs? Is it not only from hence, that the Intercourſe betwixt the Brain and Muſcles of that Part is wholly ſtop'd? If the Nerves were deſign'd and fram'd by Nature to do the Office of *Strings* or *Cords* only, Why were they not made of one continued Subſtance, but of many ſlender Filaments or Threads? And why were not theſe ſmall Threads cloſely twiſted together into a ſtrong Cord, but extended as Parallels, Side by Side, and intercepted with many narrow *Canals* or Paſſages betwixt them, and all incloſ'd within a membranous Coat extreamly thin and ſlender? Certainly, if we attentively contemplate the Artifice of Nature, in the Figure and Contexture of a Nerve, we ſhall find our ſelves almoſt oblig'd to acknowledge, that the *Fibres* were ſo diſpos'd in *Parallels*, with ſmall *Canals* running along betwixt them, to give free and quick Paſſage to the ſubtle Influence to be tranſmitted from the Brain into the *Muſcles*, for the invigorating of their Fibres. And *Galen* reflecting upon this, that if a Nerve be cut aſunder, the Muſcle into which it was inſerted becomes ever after incapable of being us'd to *Voluntary Motion*; from thence with great Aſſurance he concludes, *Nervi igitur, Rivorum in Morem, a Cerebro, ceu quodam Fonte, deducunt Muſculis Vires*: Where 'tis remarkable, that he compares the Nerves not to Strings or Cords, but to Rivulets or Conduit Pipes, framed for the Conveyance of the invigorating Influence or firſt *Impetus* from the Brain, as from a Fountain. And what could he have ſaid, either more intelligible in it ſelf, or more favourable to the Doctrine of *Animal Spirits*?

Fourthly and Laſtly, It is not unworth Conſideration, that the *Voluntary Motion* of *Reptiles*, ſuch as *Earthworms*, *Snails*, and ſuch like, is perform'd by the Help of a certain *Aerial* or *Spirituous* Subſtance iſſuing from their Heads, diſcernable in *Snails* by the Sight. For if you put a large grey Snail into a clear Vial, and hold him up againſt a good Light, you may plainly perceive that when he begins to creep, a Chain of little Bubbles will come from his Tail, and move along one after another to the Middle of his Back, and thence up to his Head. When the *Snail* remains quiet, the Motion of the Bubbles ceaſeth; as he again begins to advance, they alſo begin their Courſe anew, paſſing by a Kind of ſlow *Circulation* from the *Tail* to the *Head* along the Back, and from the *Head* to the *Tail* along the Belly: So that it ſeems probable, that theſe Bubbles being protruded or propell'd in the Manner deſcrib'd, are inſtrumental to the Motion of the *Snail*'s fore Part, to which he after draws up his hinder Part, making an Arch in the Middle, and ſo advances.

Now tho' Nature be obſerv'd to diverſify the Inſtruments of *Voluntary Motion* in various Sorts of living Creatures, according to the Diverſity of their Bulks, Shapes, Functions and Neceſſities of Life; and therefore to infer a Parity of Contrivance of them in more perfect Animals, from an Obſervation of the Action of thoſe in leſs perfect, would be but an inartificial Argument; yet for as much as ſhe ſeldom varies her more general Ways of Formation but upon Neceſſity, and when ſhe doth, her Deflections from her common Method are never ſo wide, but ſtill they carry ſome Analogy to them

ſeems not improbable, that as the progreſ- e Motion of Reptiles is perform'd by the lp of an *Aerial Subſtance*, ſo likewiſe our uſcular Motion is made by the Help of a rituous Influx from the Brain into the erves and Muſcles.

This is the Sum of the principal Argu- ents urg'd, partly by the ancient and part- the modern *Defenders* of *Animal Spirits*, d of their neceſſary Uſe in *Voluntary Mo- n*: We ſhall next proceed to change the rgument, and plead both againſt their Exi- nce and Uſe. *Phyſicians* indeed ſpeak eatly of *Animal Spirits*, as of the pleni- tent and immediate Inſtrument of the Soul all her Operations upon the Body. For hat Diſeaſe of the Brain can you name, hich hath not been attributed to their ices, either to their Defect, or Exceſs; to eir Stupidity and Sluggiſhneſs, or their ry and Tumults; to their Interception, too copious and impetuous Influx; to eir Fixation, or inceſſant Exagitation; to eir Depravation by exotique and inconve- ent Mixtures; to their Diſſipation by *piates* and Narcoticks; or to ſome other of thouſand Accidents to which they are ppos'd to be obnoxious. Nay, ſome have ne yet much further; and yet, after all r ſpecious Diſcourſes of theſe Emiſſaries the Soul, *Animal Spirits*, we are diſtracted y various Opinions concerning them, ſtill nxiouſly inquiring of what Matter, in hat Place, and how they are generated; hat are their Qualities, Motions, Ways nd Manner of Acting; and in fine, uncer- in whether they be real Creatures of Na- re, or only the Idols of humane Imagina- on.

Some have affirm'd, that the *Fluid* con- in'd in the Pores and Fibres of the Nerves, the more ſubtil Part of the *Blood*, ſepa- ated and ſublim'd in the Brain, giving it he noble Name of *Spirits*; but they have ot yet by certain Reaſons or Experiments aught us to which of all the Fluids that are own to us that is like. *Others* therefore roceeding ſomewhat farther, pronounce hat theſe *Spirits* conſiſt of *ſaline* and *ſul- ureous* Particles, highly analogous to the *ſpirits* of Wine. But this is to feed our ears only with fine Words, that ſignify ittle or Certainty. True it is indeed, that upon drinking a little Glaſs of Spirit of Wine, we find our Strength ſuddenly re- cruited; but whether from the *Humour* we call *Spirit*, or from that other Matter that makes that *Spirit fluid*, or is perhaps for ſome other Reaſon join'd to it, who hitherto has determined? Beſides, the *Animal Spirits*, if any ſuch there be, ſeem to be ſo far remote from the *Subtilty*, *Acrimony*, and Volatility of Spirit of Wine, that we want not juſt Reaſons to convince us they are not vola- tile, nor actually rarefied into Exhalations, nor acrimonious. Not volatile, becauſe if they were ſuch, certainly they would offend and trouble the Brain, as may be infer'd from the Laſſitude, Headach, Giddineſs, and other Symptoms that commonly invade Men next Morning after a Debauch with Wine, all which come from the volatile Spirits of the Wine. Not *Actual Exhala- tions*, becauſe in that State being mix'd with other Humours of the Body, they would produce Bubbles or Froth, or cauſe alſo an Inflation of the Parts containing them, nei- ther of which is to be endured. Not *Acri- monious*, pungent, or offenſive by Aſperity of their Particles, becauſe if ſuch, they would continually irritate, prick and cor- rode the Brain and Nerves, and neceſſarily force them into Convulſions, and other tumultuous Motions. We may add, that they are not, as *Sylvius* imagined, apt to *fer- ment*; becauſe if ſuch, they could not but fret and diſſolve the ſoft and tender Sub- ſtance of the Brain, *&c.*

By theſe and other Reaſons induced, our moſt excellent *Gliſſon*, in his Treatiſe of the *Stomach* and *Inteſtines*, form'd his *Animal Spirits* of a Conſtitution exempt from all theſe inconvenient Qualities: He deſcribes them to be *mild*, *placid*, *ſedate*, *fix'd*, *ſweet*, *nutritive*, *corroborating*, and apt to *conſolidate*; and in all theſe Reſpects exactly like the Spirits contain'd in the *White* of an *Egg*. Their Subject he held to be the true *Succus Nutritius*, diſtributed from the Brain thro' the Nerves to all ſpermatick Parts; which he would have to be generated only in the Brain, and that the Matter of which they are in that Manner generated, is the more mild and ſpermatick Part of the Blood, the acrimonious and more elaborate Part being reduced thence by the *Veins* for

Purpoſe perhaps diſtributed into the *Cortex* of the *Brain*; concluding, that the ſelect Part is changed into Animal Spirits, not by Sublimation, *&c.* but by Mitigation, Refrigeration, *&c.* ſo that in fine, if their Nature agree with this Character, I do not ſee by what Right they can be call'd Spirits, according to the common Notion Men have of all Things known by that Name.

Equally uncertain it is by what Kind of Motion theſe inviſible Emiſſaries are tranſmitted from the Brain through the Nerves, whether they fly ſwiftly, or creep along ſlowly; for ſome there are, who, fond of the *Chimera's* of their own Imagination, have confidently taught, that theſe Spirits are not only moved moſt rapidly in the Brain and Nerves as Lightning is darted thro' the Air, but as it were ſhot out at the Command of the Fancy into the Nerves, and recalled again by the ſame Ways in an Inſtant, according to the Exigence of the Actions to be performed by them; and yet neither of theſe ſeem conſonant to right Reaſon.

No Wonder then if Dr. *Gliſſon*, plainly diſcerning the Incongruity of this moſt rapid and reciprocal Motion attributed to the Animal Spirits, not only wholly rejected it, but thought of another plainly contrary thereunto; for he concludes, that the Spirits lodg'd in the *Succus Nutritius* are carried from the Brain through the Nerves by a Motion not impetuous or rapid, but gentler, ſlow and placid, imperceptible by the Senſe, and tending only outward; as the nouriſhing Juice of Plants is believed to creep up from the Roots along by their *Fibres*, and that they do not immediately move the Muſcles, but by recruiting their Vigour, and corroborating the Tone of their Fibres, render them able to execute their Offices promptly and ſtrongly. He adds, that in all *Voluntary Motion*, the *Fibres* of the Muſcles do by their own proper vital Motion abbreviate or contract themſelves, needing no copious and ſudden Afflux of Spirits, either Animal or Vital, to ſhorten them by Way of *Inflation*, and put them upon informing the Motions commanded by the Fancy.

Gliſſon ſuppoſes the Brain not only to have Power of moving it ſelf at Pleaſure, but what is yet more amuſing, to be alſo the Principle of our Cogitations, of our Appetite, and Animal Motion; which (ſays *Charleton*) I cannot well comprehend: For though it be granted, that the Medullary Subſtance of the Brain, however ſoft and tender to the Touch, may nevertheleſs, in reſpect of the ſmall Fibres of which placed in Streaks it is compoſed, be capable of ſome Tenſion and Remiſſion; yet do I not ſee by what Reaſon it can either think, deſire, or move it ſelf at Pleaſure, in order to Voluntary Motion. But though we ſhould grant the Brain a ſuppoſed *natural Perception*, with its inſeparable Adjuncts; yet this would by no Means ſuffice to excite and cauſe *Animal* or *Voluntary Motion*, firſt in the *Fibrils* of the *Brain*, then in the *Nerves*, and after in the *Muſcles*; becauſe this Motion is far nobler than any Motion meerly ſpontaneous, and proceeds from and depends upon a Principle incomparably more ſublime and *energetick*, namely the *Soul*. The other is this: How ſo ſmall a Contraction of the Fibrils of the Brain in that Part which is moved by the Appetite, as he ſuppoſes not to exceed the Two hundredth Part of a Finger's Breadth, can ſuffice to make a much greater Contraction in the Nerve deſtined to perform the Action commanded? For ſince the Fibrils of the Brain are not only conjoined with the Fibres of the Nerves thence produced along to the Tendons of the Muſcles, but ſo united alſo as to conſtitute ſo many little Strings or Cords continued from their Original to their Ends or Inſertions; and ſince it is from Mechanick Experiments manifeſt, that all Cords, when pull'd or ſtretch'd at one End more or leſs, are equally extended all along quite Home to the other, and this is by reaſon of the Continuity of their Parts. Conſidering theſe two certain and evident Truths, I cannot conceive, how in the ſaid little Cords of the Brain and Nerves any Contraction or Tenſion can be made that ſhall be in one of their Extremes at leaſt Two hundred times leſs than in the other.

It is indeed among *Phyſico-Mathematicians* a mighty Controverſy, Whether or no the Strings of a Lute, Viol, Harp, or any other Muſical Inſtrument, when wound up, be equally ſtretch'd or ſtrain'd in all their Parts? Becauſe when they are ſtrain'd above their Strength, they are for the moſt part broken at the Ends, rarely in any other Part; which yet

ſeems to happen only from hence, that Strings are at both Ends weaken'd by nding up the Pegs, and being tied in a ot, whereby their Coherence of Parts be- violated, they muſt needs be more fragil re than in any other Part to which that olence hath not extended. Nevertheleſs, t a Lute String ſtretch'd by a *Plummet* ng perpendicular at one End, and held by Man's Finger at the other, is extended in Parts alike, is beyond all Controverſy; l that is ſufficient; for from thence it is ſt evident, that howſoever, and in what t ſoever, a Nerve is contracted, the Con- ction muſt be equal in all Parts of it, not y a Hair's Breadth at one End, and two three Inches perhaps at the other.

But perhaps the Senſe of this Judicious thor is this: That even the leaſt Invigo- ion of the Brain may ſuffice to excite a ch greater Contraction in the *Nerves*, not much by immediately contracting them, by ſo affecting their *Perception natural*, that y may preſently contract themſelves by ntaneous Motion, and that ſo much as ſufficient to execute ſtrenuouſly the Com- nd of the Fancy. Admitting therefore s Interpretation of *Gliſſon*'s Words, we ght inquire, if that invigorating Vertue ich he confers upon the Brain, conſiſts y in the Tonick Motion of its Fibrils, to ich the Fibres of the Nerves are conti- ed; and if ſo, then whence it is that a ater and ſtronger Force or Vigoration is ited in the *Threads* of the *Nerves*, than the *Fibrils* of the Brain that move them; whether alſo the ſo often mentioned *Fi- ls* of the Brain have requiſite Notice both the Command given by the Fancy, and t it is their Office to put the ſame in Exe- tion. Other Difficulties there are in this icate *Hypotheſis* not eaſy to ſolve, and refore we ſhall not burthen the Reader th them.

Perhaps then we are equally uncertain, ether there be *in Rerum Natura* any ſuch ing as *Animal Spirits* of a diſtinct *Species* the *Vital Spirits* or not. *Harvey* denies ir Exiſtence in his Book *de Generatione nimalium*. So did all the *Peripateticks* againſt len. So Sir *George Ent*, in his *Antidiatribæ*, knowledges no Spirits in the *Animal* but at proceed from the Heat of the Blood; and *Gliſſon* is of the ſame Opinion. Indeed if a Man ſeriouſly and without Prejudice conſiders the Bulk, Temperament, various Parts and Texture of the Brain, he will at length find but little Reaſon to believe that Nature hath framed it for a Laboratory for the Spirits; for we are told, that theſe Spirits are made of the moſt ſubtil, moſt refined and volatilized Parts of the *Arterial Blood* by Way of *Sublimation*. But *Malpighius* himſelf, a moſt accurate Inquirer into the Structure of the Brain, hath after all his *Microſcopical* Diſcoveries made this ingenuous Confeſſion: *Ut Verum fatear, quo magis manifeſta mihi eluceſcit Cerebri Structura, eo magis tot mirabilium Operationum explicandi Methodum Spes excidit. Simplicem tandem dum agnoſco Cerebri Structuram, ineptum omnino ad exponenda Senſuum & tam nobilium Operationum Phænomena reor: Ita ut hoc tantum conjicere poſſim, a Cerebri & Cerebelli Glandulis in continuatos Nervos ſeparari Succum quendam, ſicut in cæteris Glandulis proprio Vaſe excretorio dilatis, &c.*

To come then to a Concluſion of this Argument: From what hath been ſaid, it ſufficiently appears, that we are ſtill in great Uncertainty not only of the Matter, Generation, Nature, Qualities and Motion of the *Animal Spirits*, but of their very Exiſtence alſo: I ſhall therefore proceed to the *Inſtrumentum proximum ſive ultimum* which immediately and ſenſibly performs the Act of *Voluntary Motion*. This all Men agree to be the *Muſcles*, in which there occur three Things chiefly to be conſider'd by *Anatomiſts*, *viz.* their common *Conſtitution* or *Structure*, their principal and ſenſible *Differences*, and the Reaſon by which they move the Parts to which they are affix'd; for theſe Things being duly explained, may perhaps bring us at length to ſuch a Degree of Knowledge of the Manner of Voluntary Motion, as may, if not ſatisfy our Curioſity, yet at leaſt advance the nobleſt of all our Intellectual Delights, the grateful Admiration of the infinite Wiſdom of our *Creator*.

Concerning the firſt therefore, it is obvious to every Man's Reaſon, that the immediate Organ of *Voluntary Motion* ought to be of ſuch a *Conſtitution* as may render it apt both to receive Invigoration, that is, to be excited to Motion by the Brain, and to move the

Member or Part to which it is affix'd. It is manifeſt therefore, that a hard, inflexible, rigid and bony Subſtance is ſo far incompetent to both thoſe Uſes, that *Galen* affirm'd, that any Part caſually becoming hard and ſtiff, though only from a Cicatrice or Scar, is thereby render'd unfit for Motion; and that conſequently the Subſtance of a *Muſcle* ought to be as Nature has made it, *ſoft*, *rare*, *flexible*, *extenſible*, and furniſhed with great Store of *Fibres*.

It is alſo requiſite, in reſpect of the Diſtance betwixt the Brain and the Muſcle, that there ſhould be ſome third Thing intermediate and continued to both, by which the firſt *Impetus* in the former may be communicated to the other, whether the Invigoration be affected by Influx of any Subſtance from the Brain, or by Dr. *Gliſſon*'s Way formerly deſcribed; and the *Nerves* being the only Part of the whole Body qualified for this Uſe, Nature hath therefore prudently inſerted one or more of them into each *Muſcle*. Now theſe two Parts, *Fleſh* and *Nerves*, are the principal Ingredients requiſite to compleat the Eſſence of a Muſcle; as may be inferr'd from hence, that there are ſome perfect Muſcles, particularly thoſe of the *Forehead*, the *Temples*, *Bladder*, *Fundament*, *&c.* in the Compoſition of which neither Tendon nor Ligament is to be found.

But becauſe there is in ſome Parts to be moved, by reaſon of their greater Gravity, a greater Reſiſtance to Motion than the muſculous Fleſh, in reſpect of its Softneſs and Tenderneſs, is of it ſelf able to overcome, chiefly in ſome Poſitions; therefore there ought to be an Addition of ſome ſtronger and tougher Subſtance, which being connected or united to the Fleſh of the Muſcle, may both corroborate the ſame, and more firmly conjoin it to the Bones, ſo as to enable it to overpower that Reſiſtance. Hence it is, that ſome Muſcles, eſpecially ſuch as are deſtined to bear great Streſs in ſurmounting the Weight of great Members, or in ſtrong Motions, are furniſhed with *Ligaments*, as well for their better Firmation to the Bones, as for Augmentation of their Strength.

But this Neceſſity not extending to all Muſcles, and a Ligament being of it ſelf immoveable and inſenſible, and the *Nerves* being, in reſpect of the Softneſs and Lax[ity] of their Subſtance, not ſufficiently ſtrong [to] pull great and heavy Bones without ſo[me] Acceſſion of Strength, it was requiſite the[re] ſhould be of both thoſe Parts compoſed a *third*, that might be firmer and ſtronger th[an] a *Nerve*, but ſofter and weaker than a *Lig[a]ment*; ſuch is a *Tendon*, which in Senſe a[nd] Aptitude to Motion much exceeds a *Lig[a]ment*, and in Strength a *Nerve*, and is there[-]fore made a Part of many *Muſcles*; I ſay, [of] many *Muſcles*, not of all, becauſe ſome ha[ve] no Need of *Tendons*; as the *Muſcles* of [the] *Tongue*, of the *Teſticles*, *Penis*, *Lips*, *Forehe[ad]* and the *Sphincters*; but thoſe only that a[re] framed for Motions either ſtrong or conti[-]nual. Thoſe that were deſtined to the Mo[-]tion of Bones, do all end in *Tendons* great[er] or leſs, and are inſerted not into the *Sync[-]* or Conjunction of two Bones, nor into [the] End of the ſame Bone from which they ari[ſe] but near to the Head of another which [they] are to move. Thoſe which are to be kept long in Motion, have likewiſe Need of *Ten[-]dons* both to corroborate and facilitate their Motions; as is moſt evident in the Muſcles of the Eye, all which are furniſhed with *Tendons*. Hence we come to underſtand why *Tendons* are by Nature conferr'd upon all Muſcles deſigned to perform ſtrong Mo[-]tions in *Flexion*, in *Extenſion*, and in that which is term'd *Motus Tonicus*; as in the Arms and Legs, and in the Back for the Erection of the *Spine*, *&c.* and why other Muſcles are made up without *Tendons*, being as in their Originals, ſo likewiſe in their Ends, only *fibrous*.

That theſe four Parts of a *Muſcle*, namely, *Fleſh*, *Nerve*, *Ligament*, and *Tendon*, might not want either Covering or Combination, Nature has providently inveſted and bound them together with a proper Membrane or Coat, which ſeems to have theſe two farther Uſes, *viz.* to cauſe *Muſcles* touching or lying upon each other to ſlip up and down ſmoothly, eaſily, and without interfering, and to unite the Force of all the *Fibres* when they act. And finally, becauſe the whole Organ requires to be continually ſupplied with Life, therefore it is copiouſly furniſhed with *Arteries* and *Veins*: Thoſe to bring *Blood*, by whoſe vital Heat all Parts are impregnated with influent Life: Theſe to re[-]

urn the ſame *Blood* to the *Heart* after it hath erformed that Office. And this may be ufficient to explain the Conſtitution of a *Muſcle*.

As to the ſecond Thing to be conſider'd, amely, the *Differences* obſerved among ma- y various *Muſcles*; theſe are many, as be- ng taken from their Diverſity in *Subſtance*, *Quantity*, *Figure*, *Poſition*, *Origination*, *Inſer- ion*, *Actions*, and *Uſes*, all which I ſhall light- y touch upon. And firſt in reſpect of *Sub- ance*, ſome *Muſcles* are moſtly *Carnous*, as all he *Sphincters*, the *Muſcles* of the *Tongue*, *&c.* Others moſtly *Nervous* or *Membranous*, as he *Faſcialata* abducing the *Tibia*, the *Qua- rata*, called by *Galen Muſculoſa Expanſio*, y others *Diſtortor Oris*, becauſe it is firſt nvoluntarily contracted in that *Convulſion* amed *Spaſmus Cynicus*, and ſome others.

In reſpect of Quantity, ſome are *long*, as he *Rectus Abdominis*, the *Longiſſimus Dorſi*, he *Sartorius* in the Thigh, *&c.* others *ſhort*, s the *Pyramidales* in the Bottom of the Bel- y; others *broad*, as the *Oblique* and *Tranſ- erſe* Muſcles of the *Abdomen*, the *Latiſſimus Dorſi* depreſſing the Arm, *&c.* others *narrow*, s thoſe of the *Fingers* and *Toes*; others *thick* nd *bulky*, as the two *Vaſti* of the Thigh, the *Glutæi* of the Buttocks, *&c.* others *thin* and *ender*, as the *Gracilis* bending the Leg, *&c.* n reſpect of Figure, ſome are *triangular*, ome *ſquare*, ſome *pentagonal*, ſome *pyrami- al*, ſome *round*, ſome of other Shapes; as is xemplified in the *Deltoides*, *Rhomboides*, *Sca- nus*, *Trapezius*, *&c.* In reſpect of the Po- ition or Courſe of their *Fibres*, ſome are blique, ſome tranſverſe, ſome above, ſome elow, ſome before, ſome behind, ſome on he right, others on the left Side: Where we ay obſerve in the general, that all oblique Muſcles ſerve to oblique Motions, all *right* o direct Flexion or Extenſion, all internal o Flexion, all external to Extenſion.

In reſpect of their Origination, ſome ariſe rom *Bones*, and that either from the Heads f them, as moſt of the greater Muſcles do; r a little below, or from ſome *Sinus* r ſmall Cavity in the Bone; ſome on- y from one Bone, ſome from two or three; thers from *Cartilages* or *Griſtles*, as the Muſ- les proper to the *Larynx*; others from the *Membrane* inſhrouding the *Tendons*, as the *Muſculi Vermiculares ſive Lumbricales* in the Hands and Feet; and others again from other Parts, as the *Sphincters*. In reſpect of their Inſertion, ſome are inſerted into *Bones*, ſome into *Cartilages*, as the Muſcles of the *Eyelids* and of the *Larynx*; others into a *Membrane*, as the Muſcles moving the Eye; others into the *Skin*, as thoſe of the *Lips*; ſome ariſing from divers Parts are inſerted into one, and on the contrary, others ſingle in their Original are divided into their Terminations.

In reſpect of their Parts, by which we underſtand the Head, Belly or Tail of a Muſcle, the Differences are various. Moſt Muſcles have but one Head, yet ſome have two, ſome three; whence they are named *Bicipites* and *Tricipites*. Moſt have but one *Venter*, yet ſome are double bellied, as the Muſcle ſhutting the lower Jaw, that of the *Os Hyoides*; whence they are called *Digaſtrici* and *Biventres*. Of ſome the Tails are broad and membranous, of others round and ſlender; of ſome ſhort, of others long; of ſome perforate, of others entire; of ſome ſingle, of others double, triple, *&c.* In reſpect of the Diverſity of their *Actions*, in ſhort, the *Muſcles* admit of a triple Difference: The firſt is, that ſome are *Confederates*, both concurring to one and the ſame Motion either of *Flexion* or *Extenſion*, one being placed on the right, the other on the left of the Member; others Antagoniſts, which perform Motions contrary to each other. And indeed there are but few *Muſcles* that have not their Opponents: To every *Flexor* is oppoſed an *Extenſor*, to every *Adductor* an *Abductor*, to every *Elevator* a *Depreſſor*, excepting only the *Sphincters*, the *Cremaſters*, and the *Oeſophagus*. The *Confederates* generally are equal in Size, Number and Strength; the *Antagoniſts* not, but different according to the Weight of the Part to be moved, and to the Force of the Motion. The ſecond Difference conſiſts in this, that ſome of the Muſcles move only themſelves, as the *Sphincters*; others move other Parts beſides themſelves. The third and laſt Difference ariſes from their proper Motions; whence ſome are named *Flexores*, others *Extenſores*; ſome *Elevatores*, others *Depreſſores*; ſome *Adductores*, others *Abductores*; ſome *Rotatores*, ſome *Maſſeteres*, ſome *Cremaſteres* or *Suſpenſores*, ſome *Conſtrictores*, *&c.*

As for the last general Theorem, namely, the *Reason* and *Manner* of the *Muscles* moving the Parts to which they are affix'd when themselves are invigorated by the Will or Appetite; forasmuch as the *Locomotion* of the whole Body, or any Part thereof, if consider'd *per se*, that is, meerly as Motion, must be consider'd either as it is a certain Commensuration of the Length of Space betwixt the *Terminus a quo* and the *Terminus ad quem*, or as it is a Countervailing of *Gravity*. In both these Respects it requires to be explained by the Help of *Mathematical Principles*.

In the first Place then I observe, that every Muscle hath a double Motion; the one *Natural*, in which the *Fibres* spontaneously retracting themselves, return to their native Position after the Cessation of that Force that extended them, as all other *tensil* Bodies do by the Motion of Restitution; the other *Animal*, in which the same Fibres are farther contracted or abbreviated by a Force communicated to them from the Brain, in order to the Performance of some Action intended by the Will or Appetite.

Now that the natural Contraction of a *Muscle* is not sufficient for *Voluntary Motion*, though we should suppose it to have been at first made upon the Stretch, is evident from hence, that betwixt every Muscle and its Antagonist the natural Power of retracting or relaxing themselves is equal; so that betwixt two contrary Powers drawing equally, the Member must remain *tanquam in Æquilibrio* unmoved; the Reason of which *Equilibration* may be illustrated by that Proposition of *Vitruvius: Quæ Corpora æqualia æqualiter & sub uno Diametro a Centro distant, illa secant perpendicularem Lineam ad Angulos rectos.* As for Example: Let two Bodies of equal *Weight* be placed, the one at one End, and the other at the other End, of or upon the Diameter of a Circle, and neither of them shall move, because their Gravity is equal at that Distance from the Center; but supposing both to move, they shall hasten to the Center of Gravity with equal Velocity, because they make equal Angles with the *perpendicular*.

It is necessary then, that, in *Voluntary Motion* of a Member *equilibrated* by two *Antagonist Muscles* of equal Force, one of the opposite Muscles overpower the other, not by its natural or spontaneous Contraction, which is equal on both Parts; but by the *Animal Force* derived from the Brain, which makes the *Natural Contraction* greater, and the invigorated Muscle prevail: Whence it comes to pass, that the Member, which before the Accession of the *Animal Force* was held unmoved, and as it were suspended betwixt two contrary equal Powers, is determined to Motion according to the Command of the Will or Appetite. In the next Place I observe, that in all *Voluntary Motion*, of whatsoever Member, there are two Terms to be acknowledg'd; one is the *Part quiescent*, or *Fulciment* to which the Head of the acting Muscle is fasten'd, because all Motion is made upon something that is at Rest; the other is in the *Part moved*, at the Insertion of the Muscle moving, and from whence the same Muscle doth by contracting it self draw the Member toward it self: And this is sometimes less, sometimes more elongated or remote from the *Fulciment*, according to the less or greater Resistance of Gravity in the Member to be moved, and according to the less or greater Vehemence required to the Motion it self; which Nature (whose Art is not more admirable in any Thing, than in proportioning the Length of the Insertion of every Muscle, from the *Hypomochlion* or Point of Rest to the Weight of the Part thereby to be moved) respecting, hath with great Sagacity supplied the little Strength of many slender Muscles, by inserting them at a great Distance from the Center of their Motion, or that Point about which the Member whereto they belong is to be moved. The Reason of which Mechanical Contrivance seems to be this; that all such remote Insertions, by substracting Part of the Length of the Bone to be moved, substract also Part of the Weight of it, and so render the Muscle able to countervail the remaining Weight with less Force.

For since there is no Motion in the Center, according to that Proposition in Mechanicks, *In Centro omnis Gravitas cessat, adeo ut neque grave, neque leve ad Centrum deprehendatur*; we may easily understand, why in many Muscles designed for strong Motions the *Terminus Stabilis* is farther elonged from the *Terminus Mobilis*, than in others destined

Motions leſs ſtrong; *viz.* that by even a all Force the Muſcle, which conſider'd in proper Bulk, or inſerted at leſs Diſtance, ould be inſufficient to the Effect inten-d, might countervail and elevate a great eight, as is exemplified in the Muſcles of e Hand, Arm, Thigh, and ſome other rts.

Now this Reaſon may be both confirmed d illuſtrated by Three Mechanick Propoions; of which the Firſt is this: *Omnis tentia Motus variatur ratione Centri ad Peririam.* The Second is this: *Quo quid retius a Centro, eo velocius movetur.* The Third : *Quo Circuli Peripheria eſt major, eo major Diameter, & Motus velocior.* And for the me Reaſon, *viz.* to augment the Force of me Muſcles conſider'd ſimply without the dvantage of Poſition, it was alſo, that Nare has in many Bones ſuperadded to their nds certain *Knobs* or *Buttings* out, called *piphyſes* and *Apophyſes*, to which the Muſes are faſten'd: Nor doth it ſeem to be of mple Conveniency alone, that ſhe has thus ntrived the Originals of all great and oſt other Muſcles higher or more elevated, ore or leſs, than their Inſertions, but of ſolute Neceſſity; for *Firſt*, Were the Head any Muſcle incumbent upon another, or on any other ſenſible Part placed lower an its Tail or *Tendon*, the Muſcle could t be contracted without manifeſt Preſſure d Pain of the ſubjacent Part.

Secondly, Had the Head of any Muſcle dened for the Elevation of a Bone been aced upon the ſame Level, or in a ſtraight ne with the Tail of it, then could not the uſcle have been contracted at all, nor conquently could the Bone into which it is ſerted have been rais'd upward; becauſe e *Fulciment* or Bone from which the Head the Muſcle ariſes, being in a direct Line the other Bone that is to be raiſed, and to which the Tail of the ſame Muſcle is ſerted, the Ends of the two Bones muſt ceſſarily preſs one on the other in a direct ne, and by their mutual Reſiſtance hinder e Contraction of the Muſcle.

But Nature perhaps had yet another Rean of this Mechanick Artifice, which I njecture to be this: Foraſmuch as the Uſe all Muſcles is to move the Parts into hich they are inſerted, and that they cannot move thoſe Parts that ſtand in a direct Line with their Inſertions, but by bringing them to make obtuſe Angles with the Bone upon which they reſt, and that obtuſe Angles cannot be made by Contraction of the Muſcles, unleſs their Originals be higher than their Inſertions; therefore it was neceſſary they ſhould be ſo framed; for where the Bone to be moved is articulated in a direct Line with the Bone that remains quiet, as the Bones of the Limbs generally are, the moveable Bone cannot poſſibly be moved, but it muſt make an Angle firſt more obtuſe, and then leſs and leſs obtuſe, until it come to a right Angle with the other Bone, that is the *Hypomoclion* or Reſt. For the Motion of a Bone made by Contraction of a Muſcle, is but an Elevation or Tranſlation of it from its former Poſition in a right Line, with the ſuperior Bone to which it is articulate, toward a perpendicular or right Angle with the ſame; and that Tranſition, from a Poſture direct to a Poſition *rectangular*, is made by *Angles* leſs and leſs obtuſe ſucceſſively betwixt the two Bones. And as for the Elevation of a heavy Bone by a Muſcle in this Manner, that cannot be effected, where the Force moving is either in a Line parallel to or lower than the Bone to be moved; but where the *movent* is ſuperior or higher, and by how much higher the movent Power is placed above the Bone to be moved, by ſo much more eaſily is the Motion performed, as may be evinced by the Mechanick Demonſtration of a *Leaver*, with a Weight hung at one End, and a perpendicular Cord in the Middle, with two other oblique Cords; I ſay then, that the Weight at the End of the *Vectis* or *Leaver* is much more eaſily or with leſs Force lifted up by the perpendicular Cord, than by either of the oblique Cords; for when the perpendicular Cord is pull'd, the whole Force is employed only in raiſing of the Weight; and therefore by how much nearer the Line is to the *Leaver*, by ſo much the more eaſily is the *Vectis* moved, and the Weight elevated: And on the contrary, by how much the further the oblique Lines recede from the perpendicular toward a Parallel with the *Vectis*, by ſo much the greater Force is required to raiſe the Weight; becauſe in a Poſition parallel, the Traction or Force is either direct-

ly from, or directly toward, the *Fulciment*, and consequently can never raise the *Vectis*.

Whence we may easily collect the *Reason* why the *Muscles* generally have their Originals somewhat higher than their Insertions, and why their Motions are so much the stronger, by how much the higher their Heads are raised; which is what was to be inquired. There is yet another *Mechanick Artifice* of Nature both to facilitate and corroborate the Force of *Muscles* designed to effect strong Motions or elevate weighty Bones, and that is, as hath been before hinted, by prolonging their *Tendons* to greater Length than those of other Muscles; for, to the sustaining of a Weight upon a *Vectis* or *Leaver*, it is all one whether the sustaining Cord be shorter or longer, provided its same Degree of Advance toward a perpendicular be observ'd.

Of Nutrition, *and what else relates to it, agreeable to the Opinions of* Harvey, Glisson, Malpighius, Willis; *and particularly from that incomparable Tract of the Learned Sir* George Ent, *called his* Antidiatriba.

THAT I may both illustrate and confirm this Doctrine of *Nutrition*, give me Leave to represent the Method and Process of Nature in the Formation of a Chick out of an Egg, according to the most accurate Observations of *Malpighius*, the Sum of which is this: *First*, That the *Spirit*, *Plastick* Vertue, or *Archeus*, call it by what Name you please, of the Egg, lies dormant as it it were and unactive for some Time after the Egg hath been laid, as if it expected the Incubation of the Hen, or some other Warmth equivalent thereto, to help it to exert its Power, and begin the great Work, and build for it self a House, according to the *Idea* or Model prescribed by the Divine Architect, whose Instrument it is. *Secondly*, That this *Spirit* having drawn the first Lines or Threads of the solid Parts of the *Embrio*, and disposed them into their proper Seats, doth immediately after design certain Ways or Passages by which those slender and delicate *Stamina* may be commodiously supplied with vital and *nutritive* Liquors for their Enlivening and *Nutrition*, and to that End mark out or appoint three Fountains; one out of the first Rudiments of each *Ventricle* of the *Heart*; and a third, consisting of many Rills, flowing from the like Rudiments of the Brain. *Thirdly*, Lest these so necessary Fountains should by Exhaustion fail, the same *Architect* provides also for their perpetual Supply. To irrigate the Brain, Rivulets are brought thither from the Trunk of the grand Canal of the *Heart*; and to feed the Current of the *Heart*, three new Streams are derived to it; one from the interior Lake or *Colliquamentum*, a second from the *exterior* by the *Navel*, and a third from the Yolk of the Egg by Veins: By all these important Conduit-pipes, fresh Liquors may continually be deduced from the Parts nourished into the *Heart*.

Fourthly, 'Tis evident, that the same invisible Agent advances in the next Place to distribute the Vessels derived from the Rudiments of the *Heart*, *viz.* the *Arteria Pulmonaris* and *Aorta*, first whole, then divided and subdivided into Branches still smaller and smaller, till at last they dwindle into *Capillaries*; and on the contrary, to collect and by Degrees unite all the Rivulets that return from the *Stamina* of the solid Parts to the *Heart*, till they all meet and make a *Confluens* in the single Trunk of either the *Vena Portæ* or *Vena Cava*. And *Malpighius* hath

, by the Help of *Microſcopes*, obſerved in varicous *Veins* lying in the *Umbilical* or Space not yet extended to either the *rt* or *Liver*; and therefore alſo not the *rt*, but the *Stamina* of the Parts circum-nt, ought to be reputed the Origine of *Veins*.

ifthly, 'Tis no leſs evident, that from the inning the vital *Succus* is clear and tranſ-nt, and ſo remains till ſomewhat of the hath been mix'd with it. For not y *Malpighius*, but our equally curious *Gliſſon*, expreſly affirms, that he had ſeen od of a ruſty Colour in the Coats in-ving the *Embrio* of a Chick, before any the leaſt Signs of Blood could be diſcern'd and about the *Heart*. But this ſo early ginning of Blood may be aſcribed either the ſpeedy Excitation of the Spirits by ubation of the Hen, to whoſe Heat thoſe ins are ſomewhat nearer than the Heart or to this, that perhaps ſomewhat of a ky Tincture had preceded and cauſed that ſty or dark Red.

All the *Canals* of the Body being fix'd d open'd, and the vital Liquor exalted ne Degrees nearer to Perfection, the rit aforemention'd proceeds to finiſh the ole Body; ſo regulating its Operations, to augment thoſe Parts firſt which ought be firſt uſed; and then to add to the Di-nſions of others, whoſe Uſe may be longer nted without Detriment. The ſame Spirit, it ſpins the firſt *Stamina* of all the ſolid rts, ſo doth it gradually augment and mpleat them all out of one and the ſame mogeneous Liquor, and this by *Tranſmu-g* the ſame into as many ſeveral Forms, as re are different Kinds of ſimilar Parts in whole Body; namely into Bones, *Carti-ges*, *Ligaments*, *Tendons*, *Membranes*, *Fi-es*, &c. ſo that all the Organs are at length mpos'd of diſſimilar Parts by wonderful rtifice, without the leaſt of Confuſion or congruity. Now therefore that we may commodate this to our preſent Purpoſe, if is be the Method and Proceſs that Na-re uſes in the Generation of *Oviparous nimals*; and if ſhe uſes the like in the Pro-uction of *Viviparous* alſo, as Dr. *Harvey*'s bſervations and our own aſſure us that e doth: We may ſafely conclude, that umane *Embryo's* are in like Manner form'd, augmented and finiſh'd, by one and the ſame *Spirit*, out of one and the ſame Matter.

I ſhall add, that the ſame *Spirit* remaining and working in us through the whole Courſe of our Life, doth in the ſame Manner perpetually regenerate us out of a Li-quor analogous to the *white* of an *Egg*, by tranſmuting the ſame into the Subſtance of the ſolid Parts of our Body: For *Nutrition* is neceſſary to all Animals, not only in reſpect of the Augmentation of their Parts, while they are little *Embryo's*, but alſo in reſpect of their Conſervation after during Life; becauſe their Bodies being in a natu-ral Conſumption or Exhauſtion, wou'd in-evitably be ſoon reſolv'd into their firſt Elements, unleſs Providence in a natural Courſe had ordain'd a continual Renovation or Reparation of the Parts by Subſtitu-tion and Aſſimilation of freſh Matter, in the Room of thoſe Particles diſpers'd and conſum'd.

The *Depræ dator* then, or efficient Cauſe of the perpetual Conſumption of our Bodies, ſeems to be, what all Philoſophers unani-mouſly hold it to be, the *vital Heat* of the *Blood*, therein firſt kindled, and continually renew'd, and by the Arteries diffuſed to all Parts of the Body, that they may thereby be warm'd, cheriſh'd and enliven'd. This *vital Heat* continually glowing within us, and principally in the *Ventricles* of the *Heart*, is called the Flame of the Lamp of Life, and is what we generally underſtand by the *Ca-lidum innatum*. But ſuppoſing it to be an *actual Heat*, conſiſting in a certain Motion of the various Particles of the Blood, and in ſome Degree analogous to Fire or *Flame*, I cannot conceive how 'tis poſſible for it to ſubſiſt or continue for ſo much as a Moment of Time, unleſs it be maintained by conve-nient Fuel, which is thereby inceſſantly fed upon, and by Degrees conſumed: This *vital Heat* therefore without Intermiſſion agita-ting, diſſolving and conſuming the minute and moſt eaſily exſoluble Particles of the Body, muſt be the *Depræ dator* here ſought after.

The Matter conſumed we may ſuppoſe chiefly to be the fluid Parts of the Body, eſpecially the *Blood* and *Spirits*, which are eaſily exſoluble, and ſomewhat, though but little,

little, of the Substance of the solid Parts; for Experience shews us, that divers Animals, as *Bears*, *Dormice*, *Swallows*, *&c.* sleep the whole Winter without receiving any Supply of Aliment; and yet have all the solid Parts of the Body as large and firm when they awake again in the Spring, as when they first betook themselves to their *Dens* or *Dormitories*; and the Reason seems to be this, that their *Vital Heat* being all that Time calm and gentle, consumes their Blood and Spirits but slowly, as a Lamp burns long when the Oil that feeds it is much, and the Flame but little and calm.

As for the Manner how the *Blood*, *Spirits*, and other Fluids are consum'd by the Vital Heat; this may sufficiently be explain'd by the familiar Example of Oil consum'd by the Flame of a Lamp. Now continual *Dispersion* being the proper and visible Effect of Fire or Flame, the Matter or Fuel wherein it subsisteth cannot but be in continual Flux or Decay. In like Manner the *Vital Heat* of Animals subsisting by a continual Accension of new Spirits in the Blood, those Vital Spirits no sooner arrive at the *Heart*, but having warm'd and inliven'd the solid Parts, they immediately fly away, and disperse themselves by insensible Transpiration. Moreover, there being in all the solid Parts of the Body certain mild, sweet, and balsamick Spirits, as it were affix'd to and incorporated with them, 'tis very probable that the Vital Spirits acting upon them by little and little, dislodge them, render them volatile, and at length wholly disperse them; whereupon the minute Particles in which they did reside are excluded together with the Exhalations of the Blood.

Here no Man I hope will exact an accurate Computation of the daily Expences of this Vital Heat; but we may conjecture from the statick Experiments of *Sanctorius*, that the Expence is great: For Instance, if forty Pounds of Meat and Drink be supposed sufficient to maintain a Man of a middle Stature, and of good Health, for ten Days, and about twenty Pounds be assign'd to the Excrements voided by Stool and Urine in that Time, the other twenty Pounds may be reasonably ascrib'd to insensible Transpiration; but if this be conjecture, it is sufficient that we know the Quantity of *Blood* and Spirits daily exhaus by the Vital Heat that conserves Life in is very great; and that the greatest Part the Matter of insensible Transpirations the Vital Spirits, which are continual generated, and continually dispers'd.

How apt and powerful these Vital Spir are, by reason of their Subtilty and bri Motions, to exagitate and disperse the mo exsoluble Particles of even the Nerves, F bres, Membranes, and other tender and se sible Parts, may be in some Measure co lected from various *Diseases* and *Symp* that seem to arise from their various Depr vations or vitious Qualities. I shall there fore beg Leave to make a short Digressio that I may enumerate a few of those painf and contumacious Maladies which are wit good Reason referrible to the Vices of th Spirits, rendring the Tone of the nervo Parts either more strict or more lax than ought to be, at least according to the Doctri of *Prosper Alpinus*, illustrated by Doct *Glisson*.

If it happens that the *Blood* is too *vicio* that is, too abundant in Spirits, man Times it induceth Diseases depending upo *Fluxion*; for being by the Arteries protru ded into the tenderer Parts, by greater Force and Impetuosity than is fit, it rather in vades than cherishes them, by that Violence putting their unfix'd Particles into a Flux And this Fluxion usually first invades such Parts as being weaker than the rest, ar therefore more dispos'd to receive it. If th prevailing Spirits of the *Blood* be not only vinous but saline also, many Times there ensues the like *Fluxion*, conjoin'd with a *Lan guor* and Laxity of the Tone of the Parts such as is always observ'd in *Catarrhs*, in moist Coughs, Drunkenness, Heaviness to Sleep, the *running Gout*, *&c.* And 'tis remar kable, that these *Fluxions* are usually so much the more fierce and vexatious, by how much the more infirm and yielding the Nerves and Fibres of the Part invaded are; because these want Strength to make Re sistance by vigorous Contraction of them selves: Whereas Nerves naturally strong and tense, somewhat repress and break the Force of the *Blood* rushing in upon them: But if this resolving *Fluxion* happen to be accompanied with a Fermentation of the

d, then commonly the evil Conſequent *Rheumatick, Arthritick*, or *Pleuretick Fever*. On the contrary, if the *Spirits* that have in'd Dominion in the *Blood* be *ſulphu-s* or *oily*, there follows a *Fluxion*, cauſing onſtriction and ſhutting up of the in-ed Part. For tho' the Arteries pour out d abounding in impetuous Spirits, and auſe a *Fluxion*; yet notwithſtanding thoſe its, by reaſon of their Oilineſs, neither ly paſs through the Habit of the Parts, he ſaline do, nor are diſpers'd by inſenſi-Tranſpiration, but remain ſhut up as in loſe Priſon, and ſtriving for Liberty, e great Tumults and Pains. Hence are ted various *Symptoms*, according to the ious Parts into which the *Fluxion* ruſheth. particular, if the Fluxion be determin'd n the Guts, there follow grievous *Cholick ns*; if in the *Stomach*, a dire Inflation of if upon the Limbs, that ſore Affliction ed the *Rheumatiſm*. Hence alſo come ndering *ſcorbutick* Pains, *hypochondriack* nds, Rumblings in the *Stomach* and *Guts*, d-ach, *Tooth-ach*, *&c.* And all theſe ls are the more aggravated, by how much more firm and tenſe the Nerves of the t affected are; whereas in *ſaline Fluxions* contrary happens, tho' they be no leſs nicious in the End, by relaxing, fretting, as it were melting the Tone of the Parts cted.

n ſhort, if the Strength of the Nerves Fibres be greater than the Force of the od flowing in from the Arteries; in that e, Diſeaſes contrary to Fluxion will ſuc-; *viz. Obſtruction* and *Infarction*, and the moſt Part *Tranſpiration* hindered. d this Vice is always the more intended, how much the more languid and ſlug-the Vital Spirits are; for when theſe copious and vigorous, they eaſily pre-over the light Renitence or Reluctance he Nerves, and, maugre their Oppo-n, carry on the Blood in its Circuit; when they flag and act but dully, they d to the Oppoſition of the Nerves and es, and leave the groſſer and more viſ-Parts of the Blood ſticking in the Paſ-s. In a *Cachexy, Dropſy, Aſthma, Scurvy*, ſtruction of the Pipes, of the Lungs, mours and Inflammations of the *Viſ-*, *&c.* the Nerves commonly are more ſtrait or tenſe then they ought t be. But if a *ſaline Fluxion* chance to be conjoin'd with, or to ſupervene upon ſuch an exceſ-ſive Tenſion of the Nerves, it either wholly ſolves the Diſeaſe, or very much mitigates it at leaſt: Whereas on the contrary, if while the Nerves and Fibres continue ſtrong, ſuch a Conſtriction of them be ac-companied with a ſulphureous Fluxion, then it cauſes diſmal Tempeſts in the Parts affected; *Convulſions, Epilepſies, Apoplexies*, extream Difficulty of Breathing, Suffocation, Hyſterick, and other the like Paſſions.

From the Cauſes and Manner of the con-tinual Conſumption of Subſtance in Ani-mals, we may opportunely proceed to an Inquiry into the Cauſes and Manner of the conſtant Reſtauration of the ſame by Way of Nutrition. The material or conſtituent Principle, I take to be a certain mild, ſweet and Balſamick Liquor, analogous to the White of an Egg, or at leaſt the *Colliqua-mentum* out of which the Chick is form'd: For ſince all Animals are nouriſh'd with the ſame out of which they were at firſt made, we may well conclude, that the *Succus Nu-tritius* is in all Qualities like the *Colliquamen-tum* of the White of an Egg; and as to the Manner how this homogeneous Matter is accommodated to the Refection of all the various Parts of the Body, it is moſt pro-bable that this admirable Work is done gra-dually, by *Diſtribution, Appoſition, Affixion*, or *Agglutination*, and *Aſſimilation* or *Tranſmuta-tion*; all which Acts muſt be ſucceſſively perform'd before the Operation can be com-pleat.

Now if we reflect upon what hath been here briefly ſaid concerning the double Ne-ceſſity of Nutrition, and concerning the different Ways by which Life is maintain'd, and the Subſtance of the ſolid Parts re-cruited, it will plainly appear, that the Ex-pence of Aliment taken in by the Mouth, at leaſt of the *Chyle* extracted from it, is double; *viz.* that one Part of it is con-verted into the *Succus Nutritius*, the other changed into *Blood*: That we may therefore trace theſe Footſteps of Nature, we ſhall firſt inquire into the Work of *Chyliſication*, and then into that of *Sanguiſication*, in or-der to comprehend the whole Buſineſs of *Nutrition*.

Firſt

First then of *Chylification*, or the turning of the convertible Parts of our *Aliment* or *Food* into *Chyle*; to the true Knowledge or Understanding of which, we ought to inquire into the History and Nature of the Parts that conduct thereto, as the *Gullet*, *Stomach*, *&c.* but these being describ'd already at large, we shall think it sufficient to understand and set forth the Uses of the Parts. And first, the proper Use or Action of the *Gullet* is *Deglutition* or *Swallowing*, which is thereby chiefly performed; I say chiefly, because in Truth the whole Process of Swallowing consisteth in a certain Series of many Actions, by an admirable Providence of Nature combin'd in order to one End; for the Power of transmitting Meat and Drink from the Mouth into the Stomach, is founded not only in the *Oesophagus*, but in many Parts of the Mouth also, as in the Tongue, Palate, *Uvula*, and its little Muscles; in the *Larynx* and its Muscles, as well that draw it up, as those that pull it down; in the *Pharynx* and its three Muscles, and in the *Sphincter* of the *Gullet*.

There is also farther requir'd a Concurrence of two Humours, one from the *Glandulæ Salivales*, the other from the *Tonsils*, to render the Mouth and Gullet conveniently moist and Slippery; for we have it from Experience, that when these Humours fail, as in Fevers they often do, the Swallowing of Solids becomes more difficult than the Swallowing of Liquids: And on the contrary, when they are redundant, as in Catarrhs commonly it happens, Solids are more easily swallow'd than Liquids, because the Muscles subservient to this Motion need not be constring'd so closely to gripe and depress Solids, as to squeeze down Liquids.

Now in this Concourse of various Actions requisite to the whole Work of *Deglutition*, some are *Preparatory*, others *Constituent*: The *Preparatory* are, First, The Direction of the Meat and Drink towards the *Fauces*, by the Tongue and Cheeks; Secondly, The Compression of the Atmosphere, commonly called *Suction*; Thirdly, The Compression of the Thing to be swallow'd betwixt the Tongue and Palate, that it may tend inward; and Fourthly, A double *Clausure* in the Throat, to hinder the same from slipping the wrong way, as it is vulgarly called: All which are fully explain'd by Doctor *Glisson*, in his Book *de Ventriculo & Intestinis*.

First then, the Elevation or raising up of the Roots of the Tongue, together with the Head of the *Larynx*, necessarily compresses the *Bolus* sticking in the Throat, and by that Compression forces it into the Mouth of the *Gullet*; for being so environ'd that it cannot slip away, either by the Palate or Passages leading up to the Nostrils, it must be cramm'd into the Orifice of the Gullet, there being no other Way left open by which it may free it self from Compression: Nor doth this instantly cease, but is continued till the Roots of the Tongue and Head of the *Larynx* filling up the whole Cavity of the Throat, have thence driven all the Matter contained therein, and thrust it down into the Gullet.

Whilst this Action is perform'd, the Muscles of the *Pharynx* being also invigorated, that is, set on Work by *Tension*, cause the Membrane closely to embrace the Roots of the Tongue and Head of the *Larynx* in their Ascent; but so as that the Orifice of the Gullet is at the same Time carried upward and a little forward, to meet the Matter to be swallow'd. No Wonder then if the describ'd Compression easily squeeze into the *Gullet* all the Matter brought into the Throat, when the same is promoted by a *Clausure* on each Side, from below by the Ascent of the Tongue and *Larynx*, from above by the *Tension* of the Muscles of the *Pharynx*; and at the same Time the Mouth of the Gullet is offer'd as a Door by which it may slip away and evade the Compression. The sooner is the Matter in this Manner thrust down into the Orifice of the Gullet, the *Sphincter* Muscle thereof constringing it self, so girds the Orifice, as that it not only prevents the recoiling or slipping back of the Matter into the Mouth, but squeezes it somewhat farther down. And then the *Peristaltick* Motion of the *spiral Fibres* of the Gullet beginning, and by Degrees propelling the Sides thereof farther and farther downwards, soon thrusts the Matter into the Cavity of the Stomach: And this seems to be the most reasonable and plain Account that hath been given, how the whole complex Work of *Deglutition* is mechanically perform'd.

Of the Actions and Uſes of the Stomach. From the ſame Authors.

ET us then proceed to inquire into the Method, Cauſes, and Manner of *Di-ion*; wherein we may more opportunely nſider the *Actions* and Uſes of the *Ventricle Stomach*, whoſe admirable Structure and rious Parts has been ſo particularly exa-n'd. In this Diſquiſition, Nature her hath plainly mark'd out the Steps where-we are to tread; and theſe are divided o eight diſtinct Operations, which are *nger*, *Thirſt*, the *Periſtaltick Motion*, *Re-tion*, *Retention*, *Digeſtion*, *Secretion*, and *pulſion*.

Among the many Differences betwixt *nts* and *Animals*, this is not the leaſt re-rkable, That Plants are fix'd by their ots, which ſerve them inſtead of a Mouth d Stomach: But *Animals* having their omachs within their Bodies, and ſucking Juice immediately from the Earth or the e, are therefore forced to change their tions, and range from Place to Place to d Food convenient for their Suſtenance. nd becauſe the Capacity of their *Ventri-* and Guts, is not ſo great as at once to ntain a Quantity of Food ſufficient to intain Life for many Days together, it is ceſſary they ſhould be often recruited by ing freſh Aliment. Now the *Goad* that mpels them to feed, is *Hunger* and *Thirſt*; one urges them to ſeek Meat, and the er *Drink*; which *Gliſſon* juſtly calls *Ap-ite*, which ſignifies a Deſire after *Meat* d *Drink*, or a Senſe of *Thirſt* and *Hunger*. e *Object* of *Hunger* is either *Abſent* or *Pre-*. The *Abſent Object* proper to *Hunger*, ctor *Gliſſon* conceives to be that *Nutritive culency* or *Juicineſs* which all wholſome ats contain in them more or leſs, and ich being alterable, is apt to be chang'd o *Chyle*, *viz.* a certain Subſtance or Mat-that is mild, eaſily mutable, abounding ſweet and fix'd Spirits, that are not deſti-e of Fatneſs, and a due Proportion of t; for all Aliments contain in them co-us Spirits, and thoſe for the moſt Part d, which the Stomach, by inducing *Fermentation* upon them, excites, and brings to a certain moderate *Fluor*, that they may more commodiouſly be thence tranſmitted in the *Lacteals*, and ſo become Nouriſhment to all the Parts.

The *Preſent Object*, is that offenſive gnawing Kind of Pain that moleſteth the Stomach whenſoever it wants and craves Meat: The Reaſon of this ingrateful Senſation ſeems not, as the Ancients taught, to conſiſt in a certain *Suction*; but to ariſe merly from ſome acid or acrid Humours contain'd in the Cavity of the Stomach, which by Aſtriction, Aſperity, Eroſion and Fretting of the inmoſt Membrane or Tunicle of the Stomach, cauſe it to feel a Kind of *Vellication* or *Twitching* of the *Fibres*, and to complain of the Want of that mild, ſoft and nutritive Juice that is requiſite to mitigate and extinguiſh that offenſive *Vellication*. Having thus conciſely propos'd what ſeems moſt probable concerning the double Object of *Hunger*, we ſhall haſten to the *Conſtitutions* of the Stomach.

Theſe *Conſtitutions* are either Common or Proper: The Common are, 1ſt, The *Temperament*; 2ly, The *Tone*; 3ly, The *Cavity*; 4ly, The *Aſperity* of the inner Coat; 5ly, The *Acute Senſation*; and 6ly, The porous Subſtance of the inmoſt Coat of the *Ventricle*.

Among theſe, the firſt Place is due to the *Temper* of the Stomach, upon the Juſtice of which the natural Vigour of craving Meat ſo neceſſarily depends; ſo that if the *Temper* be depraved or vitiated, the Appetite ſoon becomes languid and impaired. Of this we have an Inſtance in a *Fever*, which no ſooner invades the Body, but it dejects the Appetite, inducing great Thirſt in the Room of it; and the Reaſon ſeems to be this, that as ſoon as the *Febrile* or preternatural Heat of the Blood is brought by the *Arteries* into the inner Tunicles of the *Stomach*, the *Acid Ferment* therein lodged is either deſtroy'd, or at leaſt for that Time over-power'd.

The Second *Conſtitution* is due to the firm Tone of the Membranes and Fibres of the Ventricle; for if this *Eutonia* of the Organ be any Way vitiated, the Appetite of Courſe more or leſs languiſheth and decays; becauſe the *Stomach* having its Fibres relaxed, can neither contract it ſelf ſufficiently to embrace the Food it receives, nor be duly ſenſible of the Complacency thence reſulting. For both the Relaxation and the infirm Coherence of the Tone of any Part very much diminiſh the Vigour of it, and induce Sluggiſhneſs and Stupidity inſtead thereof. How requiſite to the Excitation of a good Appetite the Firmneſs of the Tone of the Stomach is, may be collected from the Experience of great Drinkers, who by exceſſive Diſtention of the Coats, the continual Soaking of the Fibres, and by diluting and rinſing or waſhing away the *Acidum Eſurium*, as *Helmont* calls it, have little or no Appetite to any Kind of Food; but at length ſo ruin the Tone of the Stomach, that they become inſenſible of Hunger, and at laſt die languiſhing for Want of due Nouriſhment, or at leaſt of ſo much as is neceſſary to ſupport Nature.

The Third *Conſtitution* requiſite to *Hunger*, is a juſt or fitting Capacity or Largeneſs of the Stomach; for if it were not hollow within, it could neither be ſenſible of Emptineſs, or capable of Repletion. If its Cavity be not of a juſt Size, it can never receive a Proportion of Aliment neceſſary to ſupply the Indigence of the Body. Hence it is, that ſuch who have the Stomach leſs than is fit, are commonly ſubject to continual Pains, and frequent Vomitings, after full Meals; and that they on the contrary who have wide and deep Paunches, often eat more than they can digeſt, and ſo render themſelves liable to many Diſorders.

The Fourth, is a moderate *Aſperity* or Roughneſs of the inner Coats of the *Stomach*; for where this is wanting, as in the *Lientery* it always is, there the Appetite continually languiſhes till it be wholly loſt: And all lubricating Things, or ſuch as induce Slipperineſs upon the Inſide of the Stomach, whether they be *Food* or *Medicines*, ſenſibly blunt the Edge of *Hunger*; as *Manna*, *Caſſia*, *Eject. Lenitive*, *&c.* As on the contrary, all Things that preſerve or increaſe the Aſperity of the Lining of the Stomach, as *Verjuice*, unripe Fruits, Pomegranate Flowers and Rinds, whet the Appetite. The Fifth, is an acute Senſation of the Stomach; for was the Stomach a Part endow'd with a dull Senſe, How could it be ſenſible of the Vellication of Hunger? It was not therefore without ſingular Providence, that Nature made the inner Superficies of the Ventricle extreamly tender and delicate, and diſpers'd ſo many Nerves more than can be found in any other Part upon the Membranes compoſing it: So alſo in the laſt Place, the Appetite is inſpir'd and dull'd by the Poroſity or Spunginеſs of the inmoſt Membrane of the Stomach; for if the Pores happen at any Time to be fill'd up with the mucuous or dead Flegm ſeparated from the *Blood* in that Membrane, as uſually there are in Leucophlegmatick Virgins, and ſuch as are troubled with the Greenſickneſs, or daub'd over with any viſcous Humour and cloſed up, as in all ſcirrhous Tumours of the *Ventricle* they always are, in either of theſe Caſes the Appetite fails, the Membrane ceaſing to imbibe the *Chyle*: Hence moſt probable it is, that Mints, Red Roſes, Marmalade of Quinces, and other the like grateful Aſtringents, which are otherwiſe beneficial to the Stomach, prove highly noxious if uſed by thoſe who have Obſtructions in it: When Wormwood, Steel, Wine, and almoſt all aperient Remedies in that Caſe excite and revive the languiſhing Appetite. It is evident therefore, that to compleat the Reaſon of Hunger, it is required that the inmoſt Coat of the Stomach ſhould be free from Obſtruction.

Having run through the common Conſtitutions of the *Ventricle* in which Hunger is ſeated, we come to the Proper, whereof two are *Organick*, and one *Similar*: The Firſt conſiſteth in the Wrinkles and Folds of the inmoſt Membrane of the *Ventricle*, which being larger, and capable of greater Diſtention than the two that inveſt it, cannot therefore be conſtring'd by their Contraction without falling into Wrinkles or Folds. Now this Corrugation both augments the Aſperity of the inner Surface of this Tunick or Coat, and makes it more ſenſible of Emptineſs, which is a Part of Hunger. The other conſiſteth in the Nakedneſs

ſame Superficies of the inmoſt Mem-
ne, which renders it more apt to per-
ve, both the ingrateful Gnawing of the
d Humours when it is empty, and the
teful Juice of Meat while it is reple-
h'd, the very Nerves lying bare to the
uch of both.

The *Similar* and laſt Conſtitution of the
mach, wherein Hunger is founded, is a
tain *prædatory* or devouring *Quality*, con-
ing in an acid Impregnation, by which
is adapted to diſſolve, melt and ferment
id Meats; ſo that being mix'd together
th Liquids, they are chang'd into a *Mil-*
Chyle.

Contenting my ſelf therefore with what
h been ſaid concerning the firſt Action of
Stomach, *Hunger*; I proceed to the Se-
nd, *viz. Thirſt.* This is alſo neceſſary to
utrition, as reſpecting the Vehicle of ſo-
Aliment, whereby it is diluted and re-
ced into a thin and limpid Subſtance
led *Chyle.* A Vehicle is requiſite alſo in
ſpect of the *Blood*, which would be of too
ick a Conſiſtence, and unfit to perform its
rcuits round the Body, if it were not
w and then diluted by freſh Supplies of
ink: Nor could this vital Juice be com-
odiouſly purged and cleanſed from various
purities and excrementitious Parts, *viz.*
Bile, Salt, Tartar, and *Mucus*; unleſs it
ere daily diluted with a due Quantity of
nner Liquor; for it is by the Help of
r Drink alone that the ſaline and earthy
crements of our Blood are driven out by
rine.

That this Appetite of Drink is ſeated in
Ventricle, as in its Subject, cannot be de-
ed; but that it is confin'd to the Ventricle
ly, cannot be granted: Firſt, Becauſe
ink received into the Stomach, doth not
ways mitigate Thirſt; and therefore that
rt of Thirſt that remains after a compe-
nt Quantity of Drink, muſt reſide in
me other neighbouring Parts to the Sto-
ach; for it is unconceivable that the
mach, when replete with Cold and moiſt,
ould ſtill feel and complain of Want of
th. Secondly, Becauſe they who in Fe-
rs are tormented with inſatiable Thirſt,
mplain not ſo much of Heat in the Sto-
ach, as Dryneſs and Parching of their
ngue, Throat and Gullet. Nay, they find
more Alleviation and Relief from frequent Waſhing of their Mouths and Throats with Fountain Water, Small Beer, and other convenient Liquors, than from all the cold Drink they can pour in. The like Solace they find alſo from holding in their Mouths ſuch Things as any Way promote the flowing forth of the *Spittle*; ſuch as Prune or Pebble Stone and the like, and *Sal Prunelle*, which only held in the Mouth, and there ſlowly melted, palliates the Thirſt; which conſiſts in a Deſire after Wine, Water, Beer, Ale, Whey, Cider, and whatever Liquor elſe is fit to be drank, that is endow'd with the following Properties: Firſt, That it be liquid or fluid, like Water; Secondly, That it be humid or moiſt; and Thirdly, That it be thin, penetrating, and in ſome Meaſure cutting or ſharp, to inſinuate the deeper into the Membrane which is the Seat of *Thirſt*, and moiſten further than the ſuperficial Parts thereof.

The preſent Object that cauſes the Senſation of this Defect of Moiſture in the external Organ, *&c.* conſiſteth in the adventitious and offenſive Drineſs of the Membrane inveſting the Stomach, Gullet, Throat and Tongue; which being ordained by Nature to be perpetually irrigated with a certain mild Humour, whenſoever that Irrigation fails, immediately perceives its natural Conſtitution to be chang'd, and communicates that ungrateful Perception to the Nerves, and by them to the Brain. But this Drineſs, which we conceive to be the preſent Object of Thirſt, is not ſo much a ſuperficial Drineſs, as a profound and internal one in the Membrane therewith affected; and in that very Reſpect clearly differs from that outward Drineſs that falls under the Perception of the Senſe of *Touching.*

I come now to ſpeak of the Third Action of the Stomach, to wit, the *Periſtaltick* or *Compreſſive* Motion. The Appetites of Hunger and Thirſt being ſatisfied, the *Ventricle*, ſated with that Relief, cloſely embraces the newly receiv'd Meat and Drink on all Sides, ſpontaneouſly contracting it ſelf into a narrower Compaſs, and thereby leſſening its Cavity, ſo as to compreſs the Contents.

To found this Periſtaltick Power in the Stomach and Guts, for we are not now conſidering any other of the Cavities of the Body, Five Things are neceſſary to be conſider'd; Firſt, A Cavity or Receptacle; Secondly, Matter therein contain'd; Thirdly, Tunicks or Coats environing the ſame; Fourthly, *Fibres* to gird or conſtringe thoſe Coats; Fifthly, Diſtinct Orders, and different Texture of thoſe *Fibres:* For in what Part ſoever theſe Five Things are concurrent, as they are certainly found in the Stomach and Inteſtines, that Part hath a juſt Title to a periſtaltick Power, and may exerciſe it whenever Occaſion requires. But the two laſt Things are thoſe in which the Power is principally founded, the *Fibres* alone being the active Cauſe of the compreſſive Motion, and the different Orders and Textures of them, the Cauſes of the Differences of the ſame Motion. Our Buſineſs muſt therefore be to enquire chiefly into the Actions of the ſeveral Orders of *Fibres* formerly deſcrib'd by us in the *Tunicks* of the *Ventricle*, from the Variation of which the various Kinds of this compreſſive Motion receive their Diſtinction.

This Motion then is obſerved to be threefold, *Downward*, *Upward*, and partly *Downward* and *Upward*; the laſt Sort of Motion being ſubdivided into, Firſt, that which is performed with a certain *Luctation* or Strife; and Secondly, that which is performed not only without Strife, but with a Kind of *Sport*. Beſides theſe Differences, there are yet others ſubordinate to them: The *Periſtaltick* Motion with Strife, is either *Equal*, and then it may be called *Tonick* or *Æquilibrate*, or *Unequal*, and then it is in the yielding *Fibres* repreſſing and inverting, in the prevailing the *Periſtaltick* Motion *inverted*. The *Sportive* Motion is from its Uſe called the *Diſtributive* Motion of the *Chyle*. Beſides, all thoſe different Sorts of the Periſtaltick Motion have their various *Degrees*, by which alſo they remarkably diſcriminate among themſelves; as being ſtrong, ſometimes languid, one while torpid and ſluggiſh, another while vigorous and quick, ſometimes plain and ſedate, and ſometimes again turbulent and tumultuous.

This Periſtaltick Motion downwards being ſenſibly perform'd in the Swallowing down of Meat and Drink, in the Deſcent of the Chyle, and Excluſion of the Excrements, is ſufficiently demonſtrated from thoſe Actions, and perform'd by Vertue of all Sorts of *Fibres*. *Firſt*, by Contraction of the *tranſverſe Fibres*, which like *Zones* encking entire Circles, muſt by ſhortning themſelves make leſs Circles, and conſequently by drawing the Cavity they gird into a narrower Compaſs, compreſs and ſqueeze out the Matter therein contained upward or downward. Suppoſing then that they begin their Contraction from above, as about the upper Orifice of the Stomach, 'tis neceſſary they ſhould depreſs or ſqueeze down the Matter contained in the Cavity of it; for the inferior Fibres are ſuppoſed not to be yet invigorated or put into Action, to give Way, and to ſuffer Diſtention from the Matter contained: And this very Diſtention it is that cauſes them to act, by reſtoring them to their natural State of moderate Laxity; ſo that by this Means the inferior Fibres being ſucceſſively excited to purſue this Motion from above downward contract themſelves ſucceſſively, till they thruſt the Matter contain'd quite out of the Cavity containing it.

Secondly, Of the Right Fibres, which alſo conſpire to this Periſtaltick Motion downward; for as ſoon as the Tranſverſe contract themſelves from above, they compreſs the Right contiguous to them, and thereby incite them to contract themſelves upward by the ſpontaneous Endeavour of Reſtitution: So that they pulling the Sides of the Cavity upward, cauſe it to forſake the Matter contain'd, and by that Means promote the Deſcent of it: For in this Caſe it is all one whether the Matter contain'd be depreſs'd, or the Cavity containing be drawn upward from it. And this Subduction of the Cavity or *Ductus* from the Matter contain'd, anſwers ſucceſſively to every deſcendant Contraction of the Right *Fibres*, till the Matter be brought to the Place where Nature ordain'd it ſhould be detruded. Wherefore this complex Motion of Tranſverſe and Right *Fibres*, may not unfitly or improperly compar'd to the Mo-

n of Earthworms crawling upon the ound.

Thirdly, By the Contraction of the *Ob-e Fibres* which contribute their Help to s *Periſtaltick Motion* downward; for as y obtain a middle Situation betwixt the nſverſe and Right, ſo they perform a ddle Action; partly depreſſing the con-ned Matter, partly drawing the Sides of Cavity upwards; ſo co-operating with Tranſverſe Fibres in the Depreſſion of Matter, with the Right in the Retraction the Cavity: And in this Manner all the ree Orders of Fibres ſeem to concur to the rformance of the *Periſtaltick Motion* down-rd. To which the Motion upwards being ntrary, and effected by the concurrent onſtriction of the very ſame Fibres, the anner of it muſt be contrary, *viz.* by *Ia-rſion* of Order. For if the Contraction the *Tranſverſe Fibres* begin from below, d proceed upward, they muſt preſs the atter that they gird upward: And the *ght* at the ſame Time put into Action firſt om below, muſt draw down the Sides of Cavity from the Matter therein con-n'd, and conſequently help to impel it ward. And as for the *Oblique*, they, as the former Motion, partly aſſiſt the Action the *Tranſverſe*, and partly promote that the Right; ſo that this Periſtaltick Mo-on from below upwards, is co-incident, was ſaid, in all Things with the Motion om above downward, unleſs it be that the rder of Moving is inverted, and the Terms the Motion contrary.

The two contrary *Periſtaltick Motions* be-g thus explain'd, 'tis eaſy to comprehend e Reaſon and Manner of the *Mix'd Mo-n*, which is partly downward, partly pward, and belongs to the Stomach and uts. Of this the moſt accurate *Gliſſon* hath bſerved three different *Species*, two with *uctation*, and a third *Delightſome*; all to be crib'd to the ſame three Orders of *Fibres*, ut mov'd in different Manners, and more mplexly. Firſt, If it happen that *Fibres* ear in Situation to, but ſufficiently diſtinct om each other, Superiors and Inferiors, ſet pon the Work of Periſtaltick Motion to-ether, and that ſome by Compreſſion queeze the contain'd Matter downward, thers urge it upward; in this Caſe there muſt ariſe, inſtead of a Concurrence, a Luctation or Contention of the two mutually repugnant Forces, and the *Periſtaltick Motion* muſt be *laborious*.

Secondly, That this *Luctation* may be determined to Equality or Inequality, 'tis requiſite that the Forces of the Fibres contending be equal or unequal accordingly. To Equality of the Forces is required on both Sides *circular Fibres*, ſhutting the *Ductus* or Cavity: For if the Matter contain'd ſhould freely ſlip away, the Scope at which Nature aimed when ſhe inſtituted this Motion would certainly be fruſtrated, *viz.* the Retention of Aliment; which great Inconvenience ſhe foreſeeing, wiſely provided againſt, by placing ſtrong *circular Fibres* about each of the two Orifices of the Stomach; which ſeems to be the Reaſon why in the Stomach, and only in the Stomach, this *Luctation* is naturally found equal.

But many Times there happens as well in the Stomach as the Guts an unequal and fluctuating *Periſtaltick Luctation*; as may be inferr'd from ſlow and difficult Concoction, from Wind pent in, from a laborious Diſtribution of the *Chyle*, and many other *hypochondriack* Affections: And in this Motion alſo, as in the former, the contending Fibres are Antagoniſts, the ſuperior ſtriving on one Part, the inferior on the other: Thoſe endeavouring to thruſt down the Matter contain'd, theſe to impel it upward; but with unequal Forces: Whence it comes, that the Matter is agitated up and down by a Kind of fluctuating Motion, and therefore this unequal Contention is rightly enough call'd a *Periſtaltick Motion Fluctuating*. The Fibres concerned in this turbulent Motion, may be divided into two Kinds, the *Prevailing* and the *Yielding*.

The Third and laſt Kind of the mix'd *Periſtaltick Motion*, is that which diſtributes the *Chyle*; and which is rather placed and painful to both Stomach and Guts than tumultuous or offenſive. The Manner of this ſubtile and complex Motion may be conceiv'd from an Inſpection of the Guts of an Animal newly kill'd and open'd, while ſome Reliques of the Vital Heat are yet remaining in them; for one ſhall ſee the Guts variouſly ſhortening, wrigling and wreſting themſelves like an Heap of Earthworms crawling

crawling ſome over others, and ſtriving as it were to creep upward and downward by Turns. Now the Uſe of this admirable Motion is double; *viz.* 1. An equal Diſtribution of the *Chyle*, and other Matters contain'd in the Stomach and Guts: 2. The Agitation of the *Chyle* it ſelf; for all Things admitted into the Stomach and Guts require an equal Diſtribution in them; but the *Chyle* requires alſo a peculiar Agitation, that it may be in all Parts of the Guts brought Home to the very Mouths of the *Lacteal* Veins.

Let this therefore ſuffice concerning the *periſtaltick* Motion of the Stomach and Inteſtines, and let us proceed to the Fourth Action, called the *Reception* of the Stomach, which the Incomparable *Gliſſon* ſubſtituted inſtead of the Imaginary Faculty of *Attraction* of the Ancients, defining this to be a certain Aptitude of the Stomach, by which it relaxes its Fibres, and enlarges its Cavity, to receive Meat and Drink brought into it without Reluctation: And the Reaſon that induced him ſo to do is this, That whenever the Stomach diſlikes the Thing to be ſwallowed, the Act of Deglutition is performed with Difficulty, and accompanied with Nauſeouſneſs and great Averſion; but on the contrary, Things grateful to the Stomach, though bitter perhaps and unpleaſant to the Taſte, are yet ſwallowed and received by the Stomach with Satisfaction and Delight.

The Fifth Action of the Stomach is *Retention*, which is highly neceſſary to *Nutrition*; for the Tranſmutation of newly received Meat and Drink into *Chyle* being not performed in a Moment, but a Work of ſome Hours, unleſs they be retained in the Stomach a competent or due Time, both the *Concoction* and *Diſtribution* of the *Chyle*, without which there can be no *Nutrition*, muſt be imperfect. This *Retention* ſeems to be wholly *Organick*, and to conſiſt partly in a moderate and gentle Contraction of all the Fibres of the Stomach, but chiefly of thoſe that cloſe the two Orifices of it, partly in a due Aſperity of the inmoſt Tunicle of the ſame.

Firſt, In a moderate *Contraction* of all the *Fibres*; becauſe otherwiſe the Stomach could not closely embrace the Food while it is concocted, which requires a *Tonick Motion* of all the *Fibres*, and ſuch a one too as re their Forces in a Manner equal in all of the Stomach, except the two Or where the Conſtriction is ſtronger and and chiefly in the ſuperior, which the whole Action remains cloſed even Point: And this Contraction muſt be derate and gentle, becauſe all violent impetuous Contractions either cauſe E ſion, or at leaſt make the Retention tu tuous and inordinate, both which co fruſtrate the Deſign of Nature in the of *Chyliſication*; during which, the R the *Pylorus* is not ſo cloſely ſhut, but gives Way to *Liquids* to ſlide down now then into the Guts, though at the ſame it ſtrictly retains whatſoever is *ſolid* and yet converted into *Chyle*, that it may be ther digeſted.

Secondly, In a due Aſperity of the in *Membrane* of the *Stomach*; for as Lubr and Smoothneſs of any Surface favour ſlipping away of Bodies touching it, ſo the *Roughneſs* conduce to their Adhe and all aſtringent Remedies, as they ca Contraction of the Fibres, ſo do they co borate the Stomach; whereas on the trary, all lubricating Things conduce to *Expulſion* than *Retention*. Again, in *Lientery* there is always too great a *Slipp* of the Stomach and Guts, as there is great an *Aſperity* in *Coſtiveneſs*.

The Sixth *Action* of the *Stomach* is *coction*, which according to the Orde Nature is next to be conſider'd; for all F is ſwallow'd, receiv'd, and then retain'd the Stomach in order to its *Concoction* or *verſion* into *Chyle*. That this Operation not organick, as the others appear to be, wholly ſimilar, is ſufficiently evident hence, that the *Chyle* it ſelf when m ſimilar, and all the Actions by which made *Chyle* are ſo too; nor does the Ca of the Stomach contribute more to Work, than a Pot doth to the boiling of Fleſh that is put in it over the Fire.

It is true nevertheleſs, that the Organ which the Work of *Chyliſication* is perfor is principally the Stomach, in which *coction* is moſt vigorous, and to which ture hath committed the moſt difficult of the whole Operation. Then know what Kind of Operation the Converſio

and Drink into Chyle is, and where
rmed, we are to inquire in the next
; First, What are the capital Differen-
f Aliments to be concocted in the Sto-
: Secondly, What various Alterations
Food ought to undergo before it can be
ght to the requisite Perfection of *Chyle*:
Thirdly, What are the Causes by which
Changes are effected.

to the First, *viz.* The Differences of
ents to be digested, 'tis well known,
all our Food is either *Meat* or *Drink*,
or *liquid*, and all our Drink either *spi-*
s or *watery*. That all potulent Liquors
re less *Coction* in the Stomach than solid
s, is not to be doubted; because they
rather to dilute the thicker Aliments,
give them a Consistence requisite to their
version into *Chyle*, than to Nourishment;
because daily Experience teaches, that by
much the thinner and more penetrating
iuretick they are, by so much the sooner
pass by Urine without any notable Al-
ion, as we see in the *Spaw* and *Tunbridge*
rs.

iquid or Spoon Meats also, as Broths,
, and the like, are sooner and more
y digested than *solid*; because their *nu-*
ve Parts being actually dissolv'd before-
d, they require only a light Elevation
heir Spirits by the *Fermentation* of the
nach to make them perfect *Chyle*, and fit
e admitted into the *Venæ Lacteæ*; pro-
d, that if they be of a thick Consistence,
ap, Barley Cream, Jellies, Butter'd Eggs,
such like, they be first diluted with
nk, that they may more readily pass in-
he *Milky Veins*.

olid Meats, as they are of the greatest
rishment, so are they most difficult of
estion; for they must pass thro' all the
ous Alterations requisite to the Con-
ion of any Aliment whatsoever, before
can be brought to the State of perfect
e. While they remain in a solid Form,
s impossible for them to enter into the
onspicuous Mouths of the *Lacteals*; and
efore it is necessary they should be mel-
and reduced into the Form of Liquor,
east that the Tincture drawn from them
be such before they be offer'd to them.
Now those various Alterations requisite
the perfect *Concoction* of solid Meats are
but two, *viz.* *Liquation*, and *Extraction* of *Tincture*. By the first they are dissolv'd into a Kind of Jelly or Mucilage; for Bread is by Digestion turn'd into a Pap, and the softer Parts of Flesh into a Jelly. The harder Parts of neither are wholly dissolv'd, but for the most part commix'd with the Excrements of the Belly. By the other the Tincture of solid Meats is extracted; and this Alteration is competent to such tough and stubborn Meats as refuse to be dissolved. Some Things indeed are now and then swallow'd down, that, by reason of their Hardness, are incapable either of Dissolution, or of yielding any Tincture, such as Cherry-stones, the Kernels of Grapes or Raisins, *&c.* Now these are the two requisite Alterations proper to solid Meats; besides which, there remain yet Three others common to both, *solid* and *liquid*. Of these,

The First is *Dilution* or thorough Mixtion of them with the Drink, without which even Liquids themselves, if of a Consistence tending to Thickness, could never be transmitted into the *Venæ Lacteæ*. To this *Dilution* of *Solids* is required at first a small Quantity of Liquor; because a large Draught in the Beginning of a Meal doth dissolve not the whole Substance of the Meat, but only the more tender and thinner Parts of it, and extract them by Way of Tincture, leaving the rest untouch'd. But after the Substance of the Meat hath been liquated into a Jelly, a larger Proportion of Drink is requisite to give it a thinner Consistence.

The Second is an Exaltation of the Spirits of the Meat to the Degree not of *Volatility*, but *Fusion*, that they may be more easily admitted into the *Venæ Lacteæ*, and passing thence into the Blood, serve to recruit the vital Spirits; for the proper Office of the Stomach is to make of the Food a permanent Liquor, which ought to be replete with gentle Spirits, that the vital, which are continually wasting, may be from thence supplied: Whence we may collect what the Reason is that Wine and all vinous Drinks do less require this Alteration than other Liquors; *viz.* because their Spirits are in the State of Fusion before they are admitted into the Stomach, and so need but little farther Elevation.

The

The Third and Laſt Alteration, common to both *Solids* and *Liquids*, is an *Aſſimilation* in ſome Meaſure of the Nouriſhment to the Nature of the Body to be thereby nouriſh'd, at leaſt bringing of it nearer to the Conſtitution of the Body; for by how much the more of Likeneſs there is betwixt two Bodies, ſo much the eaſier is the one tranſmuted into the other. Of this Aſſimilation there are two Parts, of which one takes away the Qualities of the Food that make it unlike to the Conſtitution of the Body aſſimilant; the other introduces new Qualities more agreeable and conformable to it. The firſt is deſtructive of the old Form, the ſecond *eductive* of a new one.

Having run through the general Differences of Aliments to be concocted, and the various Alterations they undergo in the Stomach before they can be brought to be *Chyle*, we come next to conſider the Cauſes of thoſe Alterations; which, tho' many and of various Kinds, may nevertheleſs be reduced to Two; the *Foreign* or Remote Cauſe, and that Inbred in the Stomach. To the firſt belong all Things that conduce to the Promotion of Digeſtion, either by previous Alteration of the Aliments, or by fortifying the Stomach. Thoſe that remotely conduce to the Work of Concoction only by Preparation of the Food, are ſuch as correct the Crudity by the Help of Fire, *viz.* by Boiling, Roaſting, Frying or Baking; or ſuch as render Things more mild and tender by *Maceration* in Brines, Pickles, Vinegar, *&c.* Some make the Food more familiar by Way of haſtening their *Maturation*, and others again diſpoſe them ſooner to Diſſolution by Mixture of ſome wholeſome and agreeable Ferment. Hence good Wine, ſtrong Beer, new and light Bread, very much aſſiſt Digeſtion. Thoſe that do ſo by corroborating of the Stomach, are *Peptick* or *Digeſtive Remedies*, as Mints, Roſes, Wormwood, Aromaticks, *&c.* But all theſe being only *Acceſſories* and *Foreign*, require no farther Proſecution in this Place.

The *Inbred* Cauſes of *Concoction* are either Inſtruments generated in the Stomach, or the Conſtitution of the Stomach, in which *Concoction* is founded. The Inſtruments are the *Ferments* firſt contained in the Stomach, whereof two are *principal*, and two *adjuvant*. The adjuvant or leſs powerful are the *Spirit* and the *acid Flegm* of the Stomach, both which help toward the Diſſolution of the Meat; but becauſe they help but little in Compariſon of the other two, I content myſelf with the bare Mention of them *en paſſant*. The more powerful are the *acidulques* of the former Meal, which, tho' more efficacious than both the adjuvant Ferments are yet in Compariſon of the *grand one* inconſiderable; therefore I ſhall paſs this over, and come to the proper *Ferment* of the Stomach.

This *Ferment* then is nothing elſe but the *ſpirituous* and *ſaline Effluvia* ſtirred up by the *vital Motion* of the *Arterial Blood*, effluent out of the *Arteries* into the Cavity of the Stomach and Guts, but chiefly of the Stomach, and therein condens'd again into a ſharp penetrating and diſſolving Liquor, fit to diſſolve the ſolid Meat, and to cauſe ſuch a Foreign Fermentation, as tends not to Volatilization, but only to Fuſion of the ſame and infinite Acting upon it, not by open Force or violent Invaſion, but, after the Manner of *contagious Ferments*, rather by clancular Inſinuation, and mixing it ſelf firſt with ſaline and ſpirituous Parts, and then with the groſſer and leſs exſoluble.

However, it ſeems to me ſufficiently probable, that this diſſolving *Ferment* is peculiar to and generated in the Stomach, becauſe nothing like it is to be found in any other Part of the whole Body; that to the Conſtitution of it is required a Concourſe of both ſalt and ſulphureous Spirits, but chiefly of ſalt, than which nothing is more ſharp penetrating and diſſolving; and that therefore it may be called, as *Næbius* ſays, *Sal Spiritibus impregnatum, acre ac pungens*; or, as *Gliſſon*, *Fermentum Ventriculi juſorium, ſeu principale Coctionis Inſtrumentum*; becauſe it doth not only efficaciouſly diſſolve the ſolid Parts of the Food, but alſo give it the firſt Degree of *Aſſimilation* to the Nature of the Animal out of whoſe *Blood* the *Ferment* it ſelf is derived; which may be one Reaſon why the ſame Aliment receives a different Preparation in the Stomachs of Animals of various Kinds, the Ferment being in ſome Sorts different from that in others reſpectively

to the Difference; which is ſufficient to
t concerning the Inbred *Ferment* of the
mach.

he Seventh Action of the Stomach is the
tribution of the *Chyle*, which is performed
Three diſtinct Actions of the Stomach
l Guts; *viz.* 1. The Excluſion of the
le out of the Stomach into the Guts:
The Agitation of it to and fro by the pe-
altick Motion, partly in the Stomach, but
efly in the Inteſtines: 3. The Tranſmiſſion
it into the Milky Veins. The Reaſon
l Manner of all which Actions I ſhall
leavour to explain.

As to the Firſt, namely, The Transfuſion
the *Chyle* out of the Stomach into the
ts, I conceive it to be effected by a dou-
Motion of the *Chyle*; one impreſs'd up-
the *Chyle*, the other natural to it, or ſpon-
eous: The firſt upward, the ſecond
wnward. The impreſs'd and upward Mo-
n, by which the *Chyle* is elevated to the
lorus, I aſcribe to the *Conſtriction* or Clo-
g of the whole *Stomach*; for all the Fi-
s of the Stomach, by the Motion of Self-
titution, common to all Tenſils, after they
ve been extended in Length, more and
re contracting themſelves by Degrees, of
ceſſity leſſen the Cavity in which the *Chyle*
contained; and this Straitening of the
vity of equal Neceſſity raiſes it up to the
lorus, and the other Orifice remaining
ſe ſhut up while the whole Act of Con-
ction laſteth, forces it out at the ſame in
e like Manner as the Liquor of a Cly-
r is ſqueez'd out at the Pipe, only by
mpreſſion of all Parts of the Bladder in-
ding it. The natural and downward
otion, by which the Chyle ſlides down
o the Guts, is to be attributed to its Gra-
y, which cauſes it to deſcend from the
lorus ſpontaneouſly into the Guts.

But this latter Motion belongs not to that
rt of the *Chyle* which is carried off imme-
tely from the Stomach by the Milky
ins that are proper to it, which yet can-
t be much, perhaps not the Hundredth
rt of the whole Maſs of *Chyle*; becauſe
Venæ Lacteæ of the Stomach are but few,
ir Number ſcarcely holding the Propor-
n of a Hundred to one, with the great
ultitudes of thoſe that take in their Fraught
m the Guts.

Nor are all the other Parts of the *Chyle* devolv'd into the Guts together and at once, but by Degrees, as it comes to be concocted; for it is conſtant from the Diſſection of Animals alive, that the *Chyle* when it is confected is fluid or liquid, and viſibly diſtinct, yea eaſily ſeparable from the ſolid Meats not yet diſſolv'd, as Broth is in a Pot diſtinguiſhable from the Fleſh boil'd in it: And becauſe the ſolid Meat is for the moſt part heavier than the Liquor, and therefore ſinks to the Bottom of the Stomach, it muſt needs by Preſſure cauſe the Liquor to riſe to the *Pylorus* to give Way to what preſſes it, ſo that the thinner Part of the *Chyle* is always firſt expreſs'd; for the two Orifices of the Stomach are of equal Height, and both a little higher than any other Part of the ſame. Whence may be collected one good Reaſon why 'tis more conducible to Health to ſit or ſtand, than to lie down upon a full Stomach: For in a Man that keeps the Trunk of his Body in an erect Poſture for ſome Time after Meat, the Load of the Stomach creates little or nothing of Trouble to the Orifices of it, but beareth only upon the Bottom and Sides; whereas he that lies down ſoon after he has fill'd his Belly, inverts the Order of his Meat, and turns the liquid Part out by the *Pylorus* before it hath been ſufficiently concocted, and ſo fills his Body with Crudities, than which I ſcarce know any Thing more pernicious to Health. And this ſeems to me ſufficient to explain the Reaſon and Manner of the *Devolution* of the *Chyle* into the Guts.

As to the Second, *viz.* The *Agitation* of the *Chyle* to and fro, this equally diſtributes the *Chyle* to all the Guts, as is not only convenient, but of abſolute Neceſſity to *Nutrition*: For ſince Nature hath diſpens'd *Venæ Lacteæ* equal to all the *Guts*, 'tis fit the *Chyle* alſo ſhould be equally diſtributed to them all ſooner or later, that each one may have its Share of the Dividend. Again, ſince only the outward Superficies of the Matter contained in the Stomach and Guts bears againſt the Orifices of the *Venæ Lacteæ*, and ſince the *Venæ Lacteæ* do not hang forth, or ſtand ſtrutting into that Matter, but are terminated in the interior Membrane, 'tis requiſite the Matter ſhould be turned and revolved to and again, that the whole may

at length be brought to their Doors, and offer'd to them.

Now this is effected wholly by an Operation organical, and the efficient is the *peristaltick Motion* of the Stomach and Guts, proceeding from the alternate Contraction and Extension of their Fibres; as we have shewn when we described the peristaltick Motion: I shall therefore here only consider the *Congruity* of the Figures of the Stomach and Guts to the Distribution of the *Chyle* by Vertue of this *Agitation.*

As the *Stomach* has the Advantage in the Office of *Concoction*, so is the Power of the Guts paramount in the Business of Distribution: And therefore Nature, which conferr'd these Powers in different Degrees upon them, and always accommodates her Instruments to their proper Uses and Ends, framed them Figures most commodious respectively to their peculiar Functions. In particular, the Stomach is made more ample, but shorter, and therefore fitter for the Fermentation of the Aliment; because by how much deeper any Cavity is, by so much more contracted is the *Superficies* of the Matter therein contained, supposing the Quantity equal, and consequently so much the less of it comes to touch the Sides of the Cavity within, and *e contra.* The Guts she made *slenderer*, but *longer*, and therefore the apter to Distribution; because Gracility conjoin'd to Longitude promote Distribution in Three several Respects: 1. The narrow or slender Cavity of the Guts wanting Depth, affects more Parts of the *Chyle* contained in it at once: 2. By reason of its greater Length, it affords Room sufficient to the greater Number of *Milky Veins* to range themselves in the interior *Superficies* of it: 3. By reason of the Gracility and Length conjoin'd, the Chyle is more easily moved from the Center to the Circumference.

The *Use* of this *Distributive Motion* is Threefold: 1. The Reduction of all Things contain'd either in the Stomach or in the Guts to an equal Diffusion, so that they may not lie congested in one Place, and be deficient in another: 2. The opportune Admotion of the whole Mass of Chyle to the Orifices of the *Milky Veins:* 3. The Facilitation of the Descent of the *Chyle.* Of these Uses, the First and Second are more eminent in the Guts by much than in the Stomach; be- cause scarce an Hundredth Part of the Ch is brought to the Orifices of the *Venæ Lact* in the Stomach, the main Stream of it ru ning down into the Guts: But the Third more conspicuous in the Stomach; becau the *Chyle*, that is by this Motion devolv to the *Pylorus*, rarely slips back again, b falls down by that Aperture into the Gu to the End that it may be there transmitte into the *Venæ Lacteæ*, which is the third an last Act of the *Distribution* of the *Chyl* which is done chiefly by Constriction of th Guts, and partly by their Compression, b the Muscles of the *Abdomen* assistant to Re spiration, and not by *Attraction* or *Exsuctio* of the *Chyle*, as the Ancients ignorantl imagined.

First, I say, chiefly by *Constriction* or *Con- traction* of the Guts; because 'tis evident t Sense, that the *Chyle* coming into the Gut fills their Cavity, swells them up, and di stends their Membranes; and consonant t Reason, and the Law of all nervous an fibrous Bodies, that the Fibres of the Gut irritated by that Distention, should ende vour to recontract themselves to their natu ral State and Position. Now this they can not do, but they must at the same Tim gird in the Membranes, and straighten th Cavity of the Guts: Nor can the Cavit containing be lessen'd without pressing th Liquor contained, and forcing it to recede some Way or other. Upwards it cannot retire, because the Mouth of the Stomach i shut against it; downward it cannot escape that Gate being shut by the *Sphincter* of th Fundament. Other Way there is none, but only that which leads into the *Venæ Lacteæ* This Way then the *Chyle* must take to de liver it self from Pressure by the spontaneou Constriction of the Guts.

Secondly, An external *Compression* of th Guts by the Muscles of the *Abdomen* co-ope rating to the Motions of Respiration; be cause 'tis most certain, that by the Con traction of these Muscles, the Guts are com press'd almost on all Parts; and no less cer tain, that this Compression helps them t squeeze out whatsoever is contain'd in them as appears in Exclusion of the Excrement of the Belly, in breaking Wind, in Belch ing, *&c.* If the Contraction of these Mus cles

s be thought too weak to compreſs the
its to a Degree requiſite to expreſs the
le, we may juſtly call in the Depreſſion
them by the *Diaphragm* in Inſpiration to
Aſſiſtance thereof; and that hath been
d of ſo great Force to the Expreſſion of
Chyle out of the Guts into the *Milky*
ins, even by *Picquet* himſelf, who was a
n of ſolid Judgment, and very curious
explaining natural Cauſes by mechanical
nciples.

If it be objected, That the Depreſſion of the
mach and Guts by the *Diaphragm* cannot
cur with the Compreſſion of them by
Muſcles of the *Abdomen*, becauſe the
ntraction of theſe is not *ſynchronick* or
incident with the Diſtention of that; we
e this to anſwer: It is true indeed, that
ſe Motions are alternate; that is, when
ſe Muſcles are contracted, the Midriff is
x'd upward, and by filling the lower
t of the Cheſt, expells the Breath up-
rd, and ſo Expiration is performed:
d on the contrary, when the *Midriff* is di-
nded, at the ſame Time theſe Muſcles are
x'd, the Bowels depreſs'd, the Cavity of
Cheſt inlarged, and the Air ruſhes into
om without; and ſo Inſpiration is made.
s I ſay is true, but this Truth ſeems not
ppugn the Opinion I now defend. For
ften as the Compreſſion of the Stomach
Guts by the Contraction of theſe Muſ-
is intermitted, ſo often is their Depreſſion
the diſtended *Diaphragm* repeated or re-
w'd; ſo that tho' theſe Motions be alter-
e, the Preſſure of the Guts, and conſe-
ntly of the *Chyle* contain'd in them, is
tinued; and as to the Expreſſion of the
e into the *Lacteals*, 'tis all one whether
Preſſure be from above or on the Sides.

There remain yet two other Actions of
Stomach to be conſider'd, *viz. Secretion*,
Excretion: 1ſt, By *Secretion*, it ſeparates
n the Blood brought into its Membranes
he Arteries, a certain ſlimy and *ſub-acid*
cus, call'd *Pituita emortua*, dead Flegm,
uſe the Spirits thereof being exhauſted,
s of no further Uſe to the *Blood*. And
, *Excretion*, by which it exonerates
lf of that dead Flegm, of the ſour Re-
es of the Food, of its own decay'd Fer-
t, and in fine, of whatſoever elſe is
ofitable or offenſive, and that either up-

ward, by *Ructation* or by Vomit, or down-
ward into the *Inteſtines*.

The *Chyle* being now, as I have ſaid, ſqueez'd out of the Stomach and Guts into the ſlender Pipes of the *Lacteals*, flows gently on in them from the Circumference toward the Centre of the Meſentery; the precedent Parts of it being neceſſarily puſh'd forward by the ſucceedent, *ut Unda Undam pellit*, till it enter into certain *Glandules* there plac'd. And this may be called the firſt Stage of the *Chyle*'s Progreſs through the *Galaxy* extruded from thence, partly by more *Chyle* crowding in, partly by Compreſſion of the *Glandules*, by the diſtended *Midriff*, and contracted Muſcles of the *Abdomen*, it flows into the common Receptacle or Ciſtern, firſt diſcover'd by the curious and fortunate *Picquet*, and thence call'd by his Name.

From the common Receptacle, the *Chyle* is transfer'd into the *Ductus Chyliferus*, which running upward near the Spine of the Back, and continued quite Home to the *Jubclavian* Branches of the *Vena Cava*, exonerate themſelves into them, and commix the *Chyle* with the *Blood*; and this alſo appears to be done by *Impulſe* or Protruſion, becauſe the two Productions of the *Diaphragm* lying immediately under the common Receptacle, cannot be diſtended, as together with the *Diaphragm* they always are in every *Inſpiration*, but they muſt force the *Chyle* therein contained to give Way, by aſcending into the Pipes that from thence tend upwards; after the ſame Manner as in artificial Fountains the Water is mounted into Pipes, only by preſſing the Surface of that in the Ciſtern.

Perhaps the ſo often mentioned Compreſſion of all Parts included within the *Abdomen*, by Conſtriction of the Muſcles thereof, may not a little contribute to this Elevation of the *Chyle*, which is the third Remove of it. Next the *Chyle*, by the ſaid *ſubclavian Veins* brought into the *Aſcendent* Trunk of the *Vena Cava*, is immediately imported, together with the *Blood* therein, deſcending into the Right *Ear* and *Ventricle* of the *Heart*, which by its *Syſtole* or Contraction ſqueezes it into the *Lungs*, where by their Reciprocations it is more perfectly mix'd with the Blood, and whence it is devolv'd into the Left *Ventricle* of the *Heart*, and finally thence ſquirted into the *Arteries*, as ſoon as it hath re-

received the Form and Name of Blood; which is the laſt Stage of its Journey, at leaſt of ſo much of it as is ordained to recruit the Maſs of Blood, and afford Matter for the Supply of the Vital Spirits or Heat.

No Man need bluſh to adhere to the Doctrine of Sir *George Ent* in this Point, *viz.* That a conſiderable Portion of the moſt delicate and ſpirituous *Chyle* is never brought through the *Galaxy* deſcrib'd into the *Blood*, but detach'd, and by other Ways, by Membranes, and Nerves and Fibres, perhaps by Way of *Filtration*, as the nutritious Juice of Plants ſeems to aſcend from the Roots up to the Top of the higheſt Sprigs, transfer'd to the Brain, and there refin'd into the laſt Aliment of the ſpermatick Parts.

Of all the Objections hitherto put into the oppoſite End of the Ballance, the moſt weighty ſeems to be that which hath been by Way of Induction alledg'd by the Learned *Lower*, from a remarkable Anatomical Experiment made by himſelf, and recorded in his Book *de Motu Cordis & Sanguinis*; whence he infers, that the whole Revenue of the *Chyle* is certainly expended upon the *Blood*. And yet notwithſtanding, I dare affirm, that though the Experiment be true and ingenious, the Inference is more than can according to the Laws of right Reaſon be deduced from thence. The Experiment in ſhort is this: If in a Dog, or any other Animal, fed about three Hours before, the Pipe leading from the *common Receptacle* then fill'd with newly imported *Chyle* be broken, as without much Difficulty it may, by making a convenient Inciſion betwixt the two loweſt Ribs of the Right Side, and tearing the Receptacle with the Nail of the fore Finger, ſo as the Courſe of the *Chyle* into the Thoracick Veſſels be intercepted; the poor Animal, how plentifully ſoever ſupply'd with Food, will nevertheleſs periſh by Famine within few Days after, and in his Breaſt will be found a Deluge of *Chyle*.

The Inference is, That it is therefore certain, that the Animal, tho' abounding with *Chyle* in the Stomach, Guts, and milky Veins, dies nevertheleſs of Famine, by reaſon that the *Chyle* cannot aſcend by the *Thoracick Pipes* into the *Subclavian Veins*, but is intercepted by the Way; and by Conſequen that the whole Stock of Chyle is impor by the chyliferous Veſſels into the *Blo* which ſeems to me to be far ſtrained: granting, that whatever *Chyle* is brou from the *common Receptacle* into the Mas *Blood* paſſes thither by no other Way b through the *Thoracick Pipes*, it will therefore neceſſarily follow, that the wh Proviſion of *Chyle* made in the *Ventricl* convey'd thence into the common Recep cle, and ſo into the *Blood*: For why may ſome Part of it be *diverted* into other Wa from the *Ventricle*, by the Membranes the of, from the Glands of the *Meſentery*, fr the *Lumbares*, and other adjacent Part Chiefly when the Ways of that Diverſi are ſufficiently probable, and when oth wiſe the ſpermatick Parts of the Body wou all be deſtitute of requiſite Nouriſhmen the *Blood* being ſo unfit to repair their B hauſtion, that in all Probability it rat preys upon and conſumes them, as hath be with many nervous Reaſons aſſerted Doctor *Gliſſon*.

Nor is it neceſſary, becauſe the Dogs on which this Experiment hath been tr died within few Days after, that therefo they died of *Famine*; for why might n ſo great a Wound, penetrating into the C vity of the *Thorax*, be ſufficient of it t to deſtroy them in that Space of Time Why is it not more conſentaneous to im gine, that in thoſe Dogs the Blood it f being depriv'd of the requiſite Quantity new *Chyle* daily, and ſo alienated from vital Conſtitution, as to have been n longer fit to afford a continual Recruit Spirits, became vappid, and ſo inferr'd Dea in a few Day's Time, though the ſolid Pa were not defrauded the while of their Por tion of the *Chyle* brought to them by oth Ways? That in long Faſting, when no *Chyle* is wanting, the Blood doth uſua eſtuate, grow acrimonious, and prey upo the Subſtance of the Body, is a Truth well known that it needs no Proof: B how long after the Wounds had been giv did the Dogs live? That our Author fe got to tell us, leaving the Number of Days undefined, notwithſtanding the C cumſtance of Time be of great Moment t wards the ſtrengthening his Suppoſition, th

y periſh'd meerly by *Famine*. For if they viv'd but two, three, or four Days, 'tis re improbable they ſhould in ſo ſhort a ne be ſtarv'd to Death, than that they iſh'd only by the Wounds they had re-ved.

Again, 'twas neceſſary, by ſo great Quan- of *Chyle* effuſed into the Cavity of the *rax*, the Motions of the *Diaphragm*, *art*, and *Lungs*, ſhould be highly impeded, t from the Putrefaction of the ſame *Chyle* acute *Fever* ſhould be ſoon kindled, and t the whole Oeconomy of Nature ſhould in ſo great Streights perverted into mor- Confuſion in thoſe ſuffering An imals. There are then, you ſee, other Cauſes beſides the Interception of the *Chyle*, to which the Death of the Dogs may be with more Likelihood aſcrib'd. Where then is the Neceſſity of that Concluſion, that Famine alone kill'd them? Or how doth this Experiment demonſtrate, that the whole Revenue of *Chyle* is as due Tribute paid into the Exchequer of the *Blood*. I am therefore to be excuſed, if I deny this mighty Objection to be of Force enough to ſubvert the Doctrine of the *Nutrition* of all the ſpermatick Parts, by the *Succus Nutritius*, clearly diſtinct from the *Blood*.

---

f the Nature of different Fluids, and particularly of the Spirits called Animal or Nervous, and their Motion. From Doctor Paxton's Specimen Phyſico-Medicum.

N order to render what I ſhall here treat of more intelligible, it may not be improper to indulge the Humours of ſome, in ſetting out from me general Principles: But that this may t be nauſeous, I ſhall only briefly preſe, That every natural Body, or particular bſtance, is but an Heap or Aggregate of all and ſingular imperceptible Parts or rticles, each of which, when conſider'd by ſelf, will neceſſarily have ſome determi- e *Size, Figure, Motion or Reſt, inſeparably ertaining to its Nature, as alſo ſome Poſition relation to others.* The firſt Part of this proved by Experience, for take any Lump Parcel of Matter, and it may be by ſome ans or other ſo divided and ſubdivided, t its Parts ſingly become imperceptible. e Second Part is moſt evident from the doubted Nature of Quantity.

Every particular Body muſt be conceiv'd, d is always found in one or both of theſe o Catholick States or Conditions, *viz.* her *fluid*, or *conſiſtent*; by reaſon the Mind of Man cannot conceive but the Parts of Matter muſt either be in Motion or at Reſt; and I call that a *Fluid*, whoſe Parts are continually moving, gliding, and ſlipping from each other, with Union or Coheſion, ſo in reſpect of each other always changing Place; as is manifeſt in Water, Wine, and ſuch Things, by reaſon they preſently part and divide, if not contained and kept together by ſome reſiſting Body; ſo likewiſe in that if we put any diſſolvable Body, as Salt or Sugar, or ſuch like, into any ſuch Liquor, it will not only be divided into inviſible Parts, that is, be diſſolv'd by it, but will alſo be gradually ſcatter'd and diffus'd through ahe whole, as may be prov'd by the Taſte, and this although the Veſſel in which it is contain'd is kept unmoved; by which it is certain the component Parts muſt be moving. I call that a *conſiſtent Body*, whoſe Parts do mutually adhere, and are united, not leaving or parting from each other ſo long as it remains in that State. As for hard, ſoft, moiſt, dry, tough, brittle, and ſuch like,

like, although we are often apt to consider them as States of Body, yet they are in Reality only Relations to us. Thus we call a Substance hard, that will not give Place to the Pressure of our Fingers; or any other Part of our Bodies soft, that readily will, *&c.* But if these are considered as Qualities or Conditions in the Things themselves, they are only as the small constituent Parts of Body are more or less moved or at Rest, or some of them moving, whilst others rest with or without Union or Cohesion, as will readily be perceived by any one, who will but give himself Leisure impartially to consider these Things.

We may likewise observe a constant Vicissitude and Change among natural Things; this or that particular *Substance* or *Qualities* beginning to exist, that is, some Parts of pre-existent Matter become cloathed with new Qualities, and so acquire from us a new Denomination, and then we say such a Thing is made, generated, or *de Novo* produced. And again, those Parts or Particles thus constituting such a Body, undergo another Change, and then the Qualities that were observed in that are alter'd, and then that Body is said to be dissolv'd or destroy'd; and another, by a new placing these Particles, is again formed. Thus natural Bodies seem to move in a Circle; for Instance, that which was Earth one Day, is Grass the next, then the Flesh of an Animal, and then perhaps moulders into its primitive Earth. Besides, we observe particular Beings to grow and increase, that is, they receive an Addition of new Parts, by which their Bulks are inlarg'd, without any Alteration perceiv'd by us, in such Qualities or Powers, that to us constitute them what they are; as is evident in the animal and vegetable Kingdom, such being esteemed of the same *Species* when little and young, as they are when full grown. And it is certain, that an Addition of new Parts to such Bodies, by which they grow, does necessarily cause a Motion in the Parts so added, or otherwise they could not now be where before they were not; and that such new Parts must have parted, or been removed from other Parts to which before they were contiguous, and Motion without Union and Cohesion is what constitutes *Fluidity*.

It is most evident then from these Considerations, that every particular natural Body, that receives an Addition to its *Bulk*, *Weight*, or *Magnitude*, must have it by the Means and Help of a *Fluid*. This is most apparent amongst Animals and Vegetables, the last being immediately nourished by the Sap, the first by the *Blood*, or some Juice analogous to it, or separated from it. It is likewise most certain, that if the Nourishment, Growth, and Increase of every particular Substance is by a *Fluid*, then their several Alterations, Diminutions, Decays, and Dissolutions, must proceed from the same Cause, by reason these being Changes, necessarily imply a Motion and Disunion of Parts; and the several Alterations and Dissolutions of most Substances are conspicuously effected by *Fluids*; for such are visibly observed to break Prison, forcing, parting and dividing from the more firm and consistent Parts, as every one may remark in the Corruptions, Putrefactions and Dissolutions of Plants and Animals.

But the main Design herein being to explain the Nature, and shew the Manner how Diseases are formed, it will be necessary to premise somewhat of Humane Body, the Subject in which they reside. But in doing this, it is not my Design to go about anatomically to display the organical Parts, that not being so material to my present Purpose; but I shall only consider it as moulded and made up of *Parts containing*, and *Parts contained*, or rather into *fluid* and *consistent Parts*.

It may be thought superfluous to go about to prove, that there are divers *Fluids* in a *Humane Body*, always existing, and easily to be discovered in it, as well as in most other of the larger Creatures; because this is so bright a Truth, it requires no Proof: For he that will doubt of this, may with equal Reason suspect, whether the *Sun* is in our Hemisphere at Noon Day, or whether there is such a Body or not; for if Men will not acquiesce in the Evidence of their Senses in such Things, there can be no Cure for their *Scepticism*; for it is as obvious there are such Things as we call *Blood* in our *Veins*, *Saliva* in our *Mouths*, *Urine* in our *Bladders*, and *Bile* in our *Galls*, as even of the above-mentioned Body.

He

Having then an undeniable Aſſurance of
real Exiſtency of ſeveral *Fluids*, in our
n as well as in other animal Bodies, our
t Enquiry is to examine what we know
their Natures, Effects, or Uſes, and un-
what Names they are comprehended, and
y to be diſtinguiſhed. But that I may
form this without Confuſion, it will
proper firſt to rank them into two Sorts,
ich for Diſtinction Sake I ſhall call *Com-*
and *Appropriate*. I call that a *Common*
id, that is diffus'd and may be diſcovered
moſt, if not in every Part or Member of
whole Body. I call that an *Appropriate*
, that is to be found in a particular Part,
ſo is only proper to that. Of the *Com-*
Fluids, we moſt apparently diſcern two
ds: The component Parts of the one are
s, and to our Senſes immediately per-
ible; the Parts of the other ſo very ſub-
and minute, as not of themſelves to be
ceived, yet eaſily to be known by their
endious Effects, Uſes, and Operations.
firſt of theſe is well known by the
ne *Blood*: The latter is what paſſes in the
ves, which, according to the received
aſe of Speaking, I ſhall call *Spirits*. The
of theſe may for farther Diſtinction be
n'd the *Primary Common Fluid*, it being
Source from whence the ſecond is ſepa-
d, and ſo in Nature firſt, as likewiſe
Fountain from whence all the Appro-
te are deriv'd.

he firſt of theſe is in a perpetual circula-
Motion, being inceſſantly impell'd thro'
proper Conduits, the Arteries, into the
neſt and remoteſt Parts of the Body, and
by its own Veſſels, or ſome inviſible
ges, it is received into the Veins, and
hem return'd to the Heart, from whence
d its Impulſe; ſo that there is not a
in the whole Man, where ſome Foot-
of this crimſon Gore may not be per-
d. The ſecond, although not ſo im-
ately to be by it ſelf diſcovered, yet
ſes are ſo obvious, and its Effects ſo
ellous, that it leaves no Room for
ot or its Exiſtence: Becauſe we find
tire Member abſolutely devoid of ſome
or Motion; not the remoteſt Surface of
hole Body, but from which we perceive
el, we are ſenſible of Pain, and have
wer ſome Way of moving; all which
art demonſtrative Proofs, that thoſe ſubtle Meſſengers of the Mind have a Reſidence, or ſome Communication there, by reaſon all Senſation and Motion are performed by 'em; as is evident, in that by hindering their Motions, or ſome Ways ſtopping their Paſſage in the Nerve, the Mind is immediately deprived of all Communication with that Part, Senſation and Motion being there loſt.

There being ſo great a Number of *Appropriate Fluids*, or, if you pleaſe, particular Juices, to be met with in humane Bodies, I ſhall not be ſo tedious as ſingly to enumerate them, but ſhall only rank them under theſe following Heads:

Firſt, Such as are merely *Excrementitious*; by which I underſtand ſuch Juices as being ſeparated, are then uſeleſs and unneceſſary to our Bodies, and are for that Reaſon exterminated and diſcharged; ſome immediately by their proper *Ductus's* adjoin'd or annex'd to their Secretory Veſſels, and others are convey'd from the Part where ſeparated, to be depoſited and retained in a particular Receptacle prepared for that End, until ſuch Time they may be conveniently diſcharged the Body. Of this Sort is the Urine, which being ſecern'd by the *Kidneys*, is repoſited in the *Bladder*. Of the firſt is the Sweat, or what paſſes by the Pores of the Skin, which is excreted by the Noſe, Eyes, or Ears; what is expectorated by Coughing. Of the laſt again is what is ſeparated into the lower Guts, to be with what is contained in them expell'd the Body by the common Paſſage of the *Anus*.

Under the Second Head may be compriz'd all ſuch as are partly excluded, the Body as *Excrementitious*, and partly again returned with the alimentary Juice into the *common Fluid* from whence they were ſeparated. Among theſe Kinds are to be number'd the *Saliva*, or the Juice flowing into the Mouth ſeparated by the *Glands* ſeated above the Head, Neck and Throat, part of which is ſwallowed with what we eat and drink, and part often ſpit out; as likewiſe what is ſecern'd by the *Liver Pancreas* and all other Juices, that are ſecern'd and pour'd into the upper Parts of the Bowels above the *Milky Veins*; for ſome Part of theſe being neceſſarily mingled with our ingeſted Aliments,

muſt

muſt in all likelihood paſs with the *Chyle* into the *Blood*, whilſt other Parts will again deſcend with the groſs Parts of our Food through the loathſome Channels of the Gut to be expell'd from thence, as may be reaſonably concluded from the obſerv'd Difference in humane Excrements, according as their Deſcents are either open or hindred.

Under a Third Head may be reckon'd ſuch as, ſo far as they appear to us, are only ſeparated that they may be again return'd into the *Blood* from whence they were ſeparated, ſome after they have made a long and comparatively ſlow Paſſage for Uſes without doubt, although unknown to us, are again with freſh Juices brought back into the *Fluid* from whence they were parted; as the *Lympha* by the conglobate Glands, which paſſing by the *Lymphæducts*, is again mix'd with the *Chyle*: And ſome again ſeemingly ſeparated, as far as we learn to be immediately remix'd with the *Blood*, as ſeems not improbable to be done by the Veſſels conſtituting the *Spleen*.

Under a Fourth Head may be accounted ſuch as are only ſeparated for the Uſe of the very Part where ſecern'd. Belonging to this Head, is what is contain'd in the Joints, the Humours of the Eyes, the Liquor in the *Pericardium*, and ſuch like; for as for that goes for the Repair and Nouriſhment of the conſiſtent organical Parts, I do not call that Secretion. Under a Fifth Head may be comprehended all particular Juices ſeparated by the Organs in either Sex, ſubſervient to Generation.

The *Spirits* likewiſe that are prepared by the Brain are alſo ſeparated from the *Blood*; but theſe being diffus'd through every Region of the Body, are treated as a common *Fluid*. Thus although our Bodies abound in ſuch a Multitude of diſtinct and appropriate Juices, and all theſe very different in their Natures and Uſes, and befitted for very contrary Ends, yet are they all ſeparated from the ſame *Blood*, the Organs form'd for ſuch Separations being ſo divinely contrived, and ſo curiouſly faſhioned, as out of one common Liquor to filtrate or ſeparate ſo great a Variety, moſt of which are very unlike in their ſenſible Qualities. And as it is from one from whence ſo many are deriv'd; ſo it is by one only Paſſage by which that *Common Fluid* is ſupply'd, which is the Source from whence the reſt are ſtrain'd, whereby to repair all the Conſumptions it continually ſuſtains.

For the *Blood* is not only waſted by theſe appropriate Juices that thus inceſſantly drain from it, but alſo in the nouriſhing and continually repairing the organical and conſiſtent Parts; for ſome of theſe likewiſe are ſo looſely compos'd, as to undergo frequent Alterations, as is manifeſt in the Fleſh ſometimes conſumes and waſts, and at other Times grows and increaſes. However ſuch Parts being by Nature condemn'd to and ſettled in certain and fix'd Abodes from whence they are not to be removed although they may ſometimes undergo Changes, and ſo become incident to Infirmities and Diſeaſes, yet being uncapable of receiving any Advantages from Medicines but as they are convey'd by the *Blood*, and the *Blood* being equally whirl'd about in Circulation to every Part of the Body, in Proportion to the Capacity of its Conduits can naturally no more reſpect one Part than another; ſo that if the Diſeaſes or Faults of the organical Parts are to be amended or cured by internal Medicines, that muſt be effected by the Means of the *Blood*; becauſe there is no other Ways whereby they can arrive at them: And the *Blood* being only paſſive in Circulation, hath no Power to diſpoſe of Medicines more to one Part than another; ſo that ſuch muſt, in Proportion to the *Blood*, be equally diſtributed to every Part of the Body. And this Conſideration ſhews the Vanity of appropriating particular Drugs to particular Parts, and the Levity of conſidering Diſeaſes in the *Solids* ſince if ſuch were diſeas'd, they could be internally remedied no other Way than by the *Fluids*.

Having already obſerved what a Variety of *Fluids* are naturally contained in a humane Body, it will be very proper to premiſe ſomewhat of their Natures in general. It is certain, the Fluidity of Subſtances is not founded in any Size or Shape of their conſtituent Particles, but purely and only in their continued Motion; by reaſon Bodies are not denominated *Fluids* from any Qualities, Powers or Operations, but from the continued Motion, and Want of Union of the Parts

rts: For whenſoever that Motion ceaſes, l the Particles unite or adhere, they loſe t Denomination. This continued Mo- n of the Particles of a *Fluid*, muſt na- ally produce a Variety of Changes and erations in the Qualities of ſuch *Fluids*, t conſiſt of Particles different in Size, un- e in Figure, and unequal in Motion; be- ſe Particles that bear no Similitude to h other promiſcuouſly moving and ro- g, muſt neceſſarily, by reaſon of their likeneſs, meet, ſtrike, juſtle and hinder h other, by which their Motions or De- minations being alter'd, the Poſitions and bitudes they bear to each other change, l of Conſequence the Qualities that are y the Effects of ſuch Habitudes and Po- ons. It is from this Reaſon that all Juices reſs'd from Plants or Fruits, all ſtrong uſions, all new Worts or Beer, all Cy- s, Perry and new Wines, which plainly, n to the naked Eye, betray the Diverſity their Parts, manifeſtly, although gra- ally, change all their Qualities; for m being turbid and opacous, they become ar and tranſparent; from being ſweet l nauſeous, they grow pleaſant and de- ous; from being flat and heavy, they e to light and ſpirituous: However they dently alter, although not always to the aſure and Advantage of our Senſes in all ir Qualities.

Whereas *Fluids*, conſiſting of homogene- and uniform Parts, cannot undergo ſuch anges; by reaſon notwithſtanding ſuch ticles continually move and change Pla- yet being equal and uniform, that Mo- n produces no ſenſible Variation in the ture of the Liquor; and from hence it is t the more uniform and homogeneous Parts of a *Fluid* are, the longer it con- es without a ſenſible Alteration in its alities; as may be obſerved in Quick- er, in divers diſtill'd Oils, Waters, Spi- , *&c.* in Wines, Beers, and all ſtrong nors, after they are perfectly fined.

This Conſideration of the Inteſtine Mo- n of the Particles of all *Fluids*, will eaſily us into the Myſtery of that Action or ration of Liquors that is term'd their *mentation*, which, in plain *Engliſh*, is no e than what we call, *The Working of the Liquor*. And all ſuch Liquors that are experienc'd to have a Tendency to alter their Qualities, are term'd Fermentative Liquors: But altho' the Word is orderly confin'd to ſignify ſuch Liquors only as are daily obſerv'd to undergo Changes, *viz.* ſuch as Beer, Ale, Cyder, ſome Wines, *&c.* yet it is plain it may with equal Reaſon be extended to all Liquors that are not entirely uniform and homogeneous, by reaſon all ſuch are prepared to undergo the ſame or like Changes, although, not being ſo much in Uſe, they are not ſo much obſerv'd; for that Action or Operation that, in the above-recited Liquors, we dignify with the Title of *Fermentation*, is not any Thing different or diſtinct from that Motion that is inſeparable from the Particles of all *Fluids*, but is really that very Motion, which only acquires this new Denomination when it becomes viſible; for by the Means of this Motion, ſuch Parts in Liquors that have the ſame Tendency, the ſame Size, and the ſame Figure, muſt neceſſarily congregate and herd together, becauſe they agree in every Thing; whilſt others in the ſame Liquor, that are neither under the ſame Degrees of Motion, nor have the ſame Determinations, nor the like Magnitudes nor Shapes, muſt as naturally be drove out and expell'd, becauſe they thus differ in every Thing. And as this inteſtine Motion in ſuch heterogeneous Liquors is term'd their *Fermentation*, ſo the Effect of this Motion in the ſame Liquors is called their *Deſpumation*; and this Deſpumation, which is only the Separation or Expulſion of the groſs, unlike, and diſagreeable Parts, always may be obſerved to ſucceed, according to the different Degrees of Motion in the minute Parts of the Liquors.

Such Fluids which, by reaſon of the Briskneſs of the Motion of their minute Parts, do uſually in no very long Time refine or clarify themſelves, do very frequently acquire a manifeſt Degree of Heat, which gradually vaniſhes as the Liquor fines, but may be continued by a frequent Affuſion of freſh unrefined Liquor. And this Obſervation perhaps may yield us no improbable Hints for the natural Reaſon of the Continuance of that Warmth that is congenite to the *Blood* of *Animals*.

However, waving that, I am inclin'd to think, from a due Conſideration of the certain Nature of *Fluidity*, and from Obſervations made upon ſeveral particular Bodies, that there are but few Liquors but will ſooner or later undergo ſome Change by the Means of this Motion, that is, but will throw off ſome Parts that are not preciſely uniform, and thereby undergo Changes in their Qualities; I ſay, not all, becauſe Quick-ſilver, and ſome Bodies drawn by Diſtillation, ſeem to admit of an Exception. The pureſt Water will, if kept, plainly diſcover ſome diſſimilar Particles lurking in its *Cryſtalline Boſom*, which, before they can be entirely divorced, will ſo taint and ſtain that harmleſs and Virgin Liquor, as to make it loathſome to the Smell, and ungrateful to the Palate. It is true, theſe Changes in Liquors conſiſting of moſt uniform Parts, appear comparatively ſo very inconſiderable, as to paſs often unobſerv'd.

It may perhaps be thought, that what I have here ſaid of the general Nature of *Fluids* can be to little Purpoſe, ſince I have already declared, that the principal Deſign of this Diſcourſe is to inquire into the Nature of Diſeaſes, which can relate to ſuch only that are contained in our own Bodies, which are widely different in moſt of their Qualities, not only from thoſe I have inſtanced in, but from all others that exiſt without an animated Body; and eſpecially when I have already proved, that we have no Means whereby to learn the Natures of particular Subſtances, but by applying our ſelves to ſuch for our Information. To which I anſwer, That although I acknowledge we can have no Certainty of the Natures of Corporeal Beings without Revelation, but as we are taught from them who are only able to reveal their own Natures; yet Analogy in ſuch Things that are without the Reach of our Senſes, is the only Means we have to regulate our Gueſſes: And in the preſent Caſe, I have only uſed Inſtances for ſuch Ends as meerly reſpect that Part only of the Nature of Fluids, which is common to all ſuch as are ſeated in our Bodies, as well as ſuch as are without it: for as to other Qualities, Powers, Efficacies, Actions or Operations, which are many and great, wherein there appears no Agreement, I pretend not by ſuch ſo much as to illuſtrate.

But the better to explain what I here intend, it will be convenient to remind the Reader what has been already proved from the ſame Author, *viz.* That there is always contained in the Body of Man common and appropriate Juices; and that of the firſt of theſe there are two Sorts, *viz. Blood* and *Spirits*; and that the *Blood* is the Source from whence not only all the appropriated, but even the *Spirits*, are ſeparated.

We can no more doubt of the Exiſtence of ſome *Fluid* that darts through the narrow Conduits of the *Nerves*, than we do of ſome Subſtance that is the Subject of Magnetical Properties, or of ſome Subſtances that produce Thunder and Lightning, ſince the Operations of the firſt in Senſation and organical Motion are as manifeſt as the laſt in the above recited Effects, and their immediate Subjects of both are equally inviſible: For what can be more obvious, than that the Mad perceive and communicate Motion by the Help of ſomewhat paſſing in the Nerves, when both Senſe and Motion are aboliſhed whenſoever this Paſſage is intercepted? And what can be more marvellous than that the Mind ſhould diſtinguiſh the many different Perceptions by the Means of the ſame Spirits, being perhaps but only differently moved, or diverſly modified by it, by outward Objects operating upon them.

By the two different Operations, *viz.* of perceiving, and imparting Motion, we come to a Knowledge of a twofold Uſe of this nimble Fluid, *viz.* as it is the Inſtrument of Senſation, and organical Motion. In the Firſt, it ſeems only paſſive, in receiving Advice from without, which muſt be by the Motion inward, that is, from the Organ to the Brain. In the Second, it is active, in giving Motion by them to this or that Part, and in this their Motion is outward from the Brain to the Part.

ut to render what follows the more in-
igible, I muſt remind you, that the Mo-
of the organical Parts are of Two Sorts:
First of which is voluntary, as being
er the Guidance of the Mind; the Se-
d involuntary or vital, as being exempt
m it. The First is what is performed by
external Muſcles, whoſe Motions we can
ulate at our Pleaſure: The Second are in
internal Parts, as thoſe in the Trunk of
Body, which we cannot as we pleaſe alter
reſtrain; Witneſs the *Pulſe*, *Motion* of the
mach, *Bowels*, and ſo forth. And indeed
ſuch as do immediately contribute to
e, are not in our Power to alter, hinder
ſuppreſs; and thoſe Motions that are in-
arable from Life, ſeem to be effected by a
yſical Cauſe; for the Spirits that are pre-
ed for theſe Motions, are ſeparated in a
inct Province of the Brain, and ſeem to
cend in their Conduits, as they are ſepa-
ed from the Blood, to actuate the Organs
itted for theſe Uſes: And the Blood is
tinued in Circulation by the Vibrations
the Heart, and the Heart is actuated and
ved by the Influx of Spirits, and Life is
ted in the Progreſſion of the Blood; ſo
t Life ſeems to run in a Circle; for the
tion of the Heart is made and continued
the Spirits, and by the Motion of the
art the Blood circulates; and the Spirits
mmunicating this Motion are prepared out
the *Blood*; ſo that the Spirits move the
art, the Heart the Blood, and the Blood
the Spirits; and in this Circle, ſo far as we
are able to perceive, Life conſiſts; becauſe
all thoſe Functions that entitle a Body to
what we call Life, immediately vary when
the Motion of the Heart and Circulation of
the Blood ceaſe. The Spirits are the active
Inſtruments to continue this vital Circle,
the Heart being only an Engine to work the
Blood, and the Blood ſuch a Liquor that
muſt be moved to be preſerv'd.

But theſe Spirits, altho' by Nature deſtined
for the moſt noble Uſes, yet being prepared
out of the Blood, will partake of its Na-
ture; for when the Blood is vitiated and
diſorder'd, theſe Spirits appear depraved, and
their Offices and Operations are irregularly
and imperfectly executed; And becauſe Life,
and conſequently Health, which is only Life
in Perfection, is founded in the abovemen-
tioned Circle; and becauſe a certain Har-
mony between the Spirits, Organs and Blood,
is required to continue that vital Circle;
therefore if either of the *Triumvirate* fails,
or is incapable to perform its Office, the Har-
mony ſuffers, and then Health is injured,
and Life is gradually deſtroy'd: For if the
Spirits are either depraved in their Temper,
perplex'd in their Order, or wanting in their
Number, they become unfit regularly to
move the Organs; from whence the Blood
flagging in Circulation, alters its Mixture.
If the *Craſis* of the Blood alters, it becomes
unfit to be moved, and incapable of yield-
ing Spirits; and if the Organs are injured,
it can neither receive nor communicate Mo-
tion.

But becauſe all the Spirits, as well thoſe
employ'd in voluntary as vital Motions, are
equally derived from the Blood; therefore
when the Blood is depraved or alter'd, they
both are equally incident to be affected with
its Vices; as is particularly manifeſt in *Fe-
vers*, in which the Spirits applied to both
Motions appear in divers Inſtances equally
affected; for thoſe employ'd in Senſation and
voluntary Motion are found incapable of
performing either of them regularly, as ap-
pears, in that Perceptions are confuſed, from
whence proceed *Deliriums*, *Phrenſies*, *&c.*
and organical Motions are prevented, as ap-
pears by the *Convulſions*, *convulſive Stitches*,
Tremblings, reſtleſs and uneaſy Motions, *&c.*
And thoſe employ'd in vital Motions fail
likewiſe in theirs, leave the *Pulſe*, ſome-
times alter, Breath varies, and the Motions
and Offices of the Stomach and Bowels
change.

Whoſoever will but attentively conſider
what paſſes in himſelf, or but heedfully ob-
ſerve what happens to others, may eaſily
perceive, that there is a natural State of the
Spirits, which muſt conſiſt in ſome juſt Tem-
per, Order or Continuity of them, whereby
they are befitted regularly to perform their
natural Offices of Senſation and organical
Motion: By reaſon it is moſt certain, that
ſometimes they do not regularly perform
either

either one or the other; as we experience in those Diseases we call *Apoplexies*, *Epilepsies*, *Phrensies*, *Deliriums*, *Mania's*, *Palsies* and *Convulsions*; in all of which, either Sensation or organical Motion is perverted or alter'd: And it is likewise certain, that we can discover nothing of the unnatural State of the *Spirits*, but as we can discern some Change, Hindrance or Disorder in these their natural and regular Functions, Offices, Uses or Operations, *viz.* of *Sensation* or *organical Motion*, we having no other Means whereby to learn any Thing of their Natures but by these; so that by weighing and comparing these we are only taught to judge of their States as whether natural and good, or unnatural and perverted, and their several Degrees. But these *Disorders* in their proper *Functions* being in their Appearances very different will be discuss'd in another Place.

RULES
FOR THE
Practice of Phyſick.

By Sir *DAVID HAMILTON* Knt. Fellow of the Royal College of Phyſicans, *London*, and Phyſician in Ordinary to the Queen.

OUR Author obſerves in his Preface, that, among other Things which leſſen the Eſteem of Phyſick, this is none of the leaſt, That moſt of our modern Phyſicians apply themſelves chiefly to ſtudy new Theories. Some adopt into their Schemes the Principles of *Ariſtotle*; others thoſe of Atoms: Some the Principles of Chymiſtry; and at laſt we have thoſe who have Recourſe to the Principles of Mathematicks. And though all of them may in ſome Things have hit the Truth, yet their Way of Writing, and their differing from one another, creates a mean Idea of this moſt noble Art in the Minds of the Unlearned, as if there were nothing but Uncertainty, and no immutable Rules in it: Whereas if they would lay aſide all Theories, except ſuch as are founded on manifeſt Experience, and apply themſelves principally to deſcribe the Hiſtory of Diſeaſes both in dead and living Bodies, and the Vertues of ſimple Medicines, they might ſo adorn this Art, that its very Enemies would own its Excellency.

This is the Motive which induced him to ſet down ſome Rules for the Benefit of Students and young Phyſicians, which he has found ſucceſsful in his own Practice; and by which 'twill appear, that the ſolid Fame and Excellency of a Phyſician does not depend on pompous Figments, or preſcribing great Quantities of various Medicines, but on a Method of Cure, ſupported by an exact Knowledge of Diſeaſes and Medicines.

This Treatiſe about the Practice of Phyſick is divided into Three Chapters. The *Firſt* is of ſuch as depend on the Honeſty of the Phyſician: The *Second* is about the Rules of Art, and a thorough Examination of the Patient: And the *Third* is about the Method of Preſcribing.

As to the *Firſt*, 'Tis the Part of an honeſt and prudent Phyſician to be diligent in Viſiting,

ſiting, and to preſcribe according to the Indication of the Diſtemper; not to curry Favour, but in Conſultations with other Phyſicians to behave themſelves with Mildneſs and Generoſity.

He adviſes againſt preſcribing too many Medicines to procure the Favour of Apothecaries, or others, which for moſt part increaſes the Danger, as well as the Charge, of the Patient, leaves the Phyſician ignorant of the Nature of the Medicines, and adds nothing to his Fame.

Some, after the Manner of Empiricks, are for haſtening the Cure all they can, either for Want of Skill, or from an Itch after vain Applauſe, without any Regard to the Iſſue of the preſent Diſtemper, or to another more dangerous or fatal that frequently follows it.

Others vary their Preſcriptions too ſoon, either becauſe they are afraid of tiring the Patient, or for fear they themſelves ſhould loſe their Reputation by the frequent Uſe of one Medicine, by which they deprive themſelves of knowing the Effects of their Medicines, and out of Complacency become Enemies to their Patients.

Nor are there wanting thoſe who will not propoſe a better and approved Method, inſtead of what is commonly uſed, leſt they ſhould fall under the Cenſure of other Phyſicians, eſpecially if the Patient ſhould die under the extraordinary Method. In this Caſe, Sir *David* ſays, a Phyſician ought to arm himſelf againſt all Reflections; for as ſometimes a Diſtemper prevails over the beſt Method, ſo at other times a Patient by Strength of Nature eſcapes under the worſt: Therefore a Phyſician ought not to tie himſelf to any Man's Method; but to aſſert his Liberty to follow any that is founded on Reaſon, is ſpeedier in the Cure, and fitter for enriching the Art.

He concludes this Head with adviſing Phyſicians to be prudently eaſy with one another; for as no Man knows every Thing, and that one ſometimes remembers what another forgets, they ought to conſider that the Life of the Patient is at Stake, and beware of ſtaining their Hands with humane Blood; and ſays, he cannot forbear telling the World, that not a few have been loſt by the Diſcord of Phyſicians.

In the *Second* Chapter, he ſays, the Characteriſtical Marks which diſtinguiſh a true Phyſician from the Herd of Quacks, is the finding out the original Diſtemper, and preſcribing proper Medicines.

The Knowledge of the original Diſeaſe is come at by a thorough Examination, beginning from the very Time that the Patient's Health began to decline, and going over the Symptoms to the very Moment that the Phyſician was call'd.

A proper Preſcription conſiſts in the Choice of Medicines according to the Indications that appear on a thorough Examination, and a Phyſician ought, before he practiſes, to be well vers'd in the Knowledge of all Parts of Medicine, and bred up in Colleges appointed for that End.

Therefore not only Empiricks, who preſcribe without Method, but likewiſe thoſe who pretend to practiſe meerly by looking into other Men's Receipts, ought to be avoided; ſince they are perfectly ignorant of the Principles and Symptoms of Diſeaſes, as well as of the Method of Cure.

That which makes a thorough Inquiry into Diſeaſes difficult, is the Imprudence or Forgetfulneſs of Patients in relating the Symptoms, which makes their Account confuſed and imperfect; and ſometimes it happens by the Unskilfulneſs or Neglect of the Phyſician.

Of how much Conſequence a thorough Examination into the Beginnings of a Diſtemper is, appears by the Failures of thoſe that neglect it, and the Succeſs of ſuch as carefully practiſe it; who are thereby taught exactly to diſtinguiſh the Symptoms, and primary from ſecundary Diſtempers, with all their Motions, which otherwiſe are either unknown or confounded: But he who makes a thorough Inquiry, is able to propoſe a ſteady, plain, and therefore a more happy Method of Cure, without having Recourſe to a *Farrago* of Medicines, which is a certain Sign of a wavering Mind.

To illuſtrate this, he gives an Inſtance of a Gentlewoman he was called to in *January*, 1690. who had made Uſe of three able Phyſicians, but in vain; becauſe they had not taken Notice of the primary Diſtemper, which was a Diminution of her *Menſes*, but only obſerv'd the Symptoms, by which they took

ook the original Diſtemper to be a Phthi-
ck: But he found upon Inquiry, that du-
ng her *Menſes*, ſhe was taken with a Nau-
ouſneſs as eating Part of a *Hare*. This
as follow'd by a Looſeneſs, then by Dimi-
ution of her *Menſes*, tili they were quite
op'd, and then ſhe fell into a Decay. Up-
n this Information, he laid aſide all the
ntiphthiſical Medicines which had been
reſcribed by others, and preſcribed as fol-
ws to provoke the *Menſes*:

℞ *Rad. Helenii*, ʒ j. *Galangæ minoris*,
alami Aromatici, ana. ℥ ß. *Fol. Menthæ*,
Melliſſæ, Abſinth. Rom. ana. M. j. *Semin.*
æniculi. dulc. Carui, Dauci, ana. ʒ iij.
accar. Juniper. ℥ ß. *Cortic. exterior. Aurant.*
ß. *Coquantur in Aquæ font. qſ. in Vaſe*
time clauſo ad ℔ ij. *addendo ſub Coctionis*
inem Vini albi, ℔ j. *Et Colaturæ adde Aq.*
ent. comp. ʒ ij. *F. Apozema. Capiat* ℥ iv.
ane, & Hora quinta pomeridiana, Diebus
ntinuis. Addantur ſingulis Hauſtibus Apo-
ematis, Elixir. Proprietatis tartariz. Gut-
s xx. *Et Tempore Hauſtibus prædict. inter-*
ſito, ſumat etiam quotidie Elixir. ejuſdem
utt. xx. *ex Hauſtulo Potus ordinarii.*

He ſays, that were he to preſcribe in the
ke Caſe now, he would leave out the
range Peel, becauſe he has found by Expe-
ence that it ſtops the *Menſes*.

By her ſole Uſe of the Elixir in her ordi-
ry Drink the 8th Day, her Vomiting was
op'd the next, and ſhe kept what ſhe eat. By
e Uſe of the *Elixir* and *Apozem* together, the
th Day her Vomiting quite ceaſed, her
ppetite was ſtrengthen'd, and her Stomach
d not ſwell ſo much after Meals. About
e 19th Day, her Coſtiveneſs began to re-
ove, and her Feveriſh Heat and Pain in
r Head to diminiſh. The 21ſt Day, ſhe
und Convulſive Pains in her Back; upon
hich he conjectured that the Time of her
Menſes drew nigh; therefore he forbad her
e Uſe of the *Elixir* both by it ſelf and in
e *Apozem*, leſt by moving the Matter thro'
e Intrails, the *Menſes* ſhould be ſtop'd;
d that he might follow the Indication
om the Pain in her Back, inſtead of the
Elixir, he added the following Things to the
Apozem:

℞ *Rad. Ariſtoloch. rotund.* ʒ j. *Fol. Arte-*
miſiæ, M. j. *Sem. Leviſtic.* ʒ iij. *Coquan-*
tur cum reliquis Ingredientibus pro Apozema-
te, & ante Apozematis ſingulos Hauſtus ſu-
matur Bolus ſequens:

℞ *Borac. Venet.* ʒ j. *Conſ. Abſynth. Ro-*
mani, qſ. mſ. f. Bolus.

This he adviſed her to make Uſe of every Day during her *Menſes*, which had very good Succeſs.

The *Third* Chapter has the Rules of Preſcribing. Sir *David* ſays, That when by a thorough Examination a ſimple Indication appears, for moſt part a ſimple Medicine is to be preſcribed, for the following Reaſons:

1. By this Method we come more eaſily and certainly to know the Specifick Vertue of Medicines than any other Way. Thus he himſelf firſt diſcover'd the Vertue of Orange Peels in too great a Flux of the *Menſes*, for which it is ſo much commended by the Famous *Riverius*. Sir *David* preſcribed the Uſe of it thus:

℞ *Corticum Aurantiorum, N°* vij. *Co-*
quantur in Aquæ fontanæ ℔ iij. *ad* ℔ ij.
& edulcoretur Colatara Sacchari alb. qſ. ut
f. Apozema. Sumantur Cochl. x. *ter qua-*
terve in Die.

This he found very ſucceſsful, eſpecially if nothing of the *Placenta* remain'd after Birth or Abortion, nor any Diſtemper in the inner Orifice of the Womb. This is a very efficacious and ſafe Medicine, when there is either a natural Efflux of Blood, or that 'tis occaſioned by the Mouths of the Veſſels being open'd, and is not attended with a Nauſeouſneſs, Loſs of Appetite, Coſtiveneſs, or Head-ach, that uſually follow the Aſtringents commonly made uſe of in this Caſe. He adds, That being ill ſpoke of by Phyſicians who uſed to preſcribe coſtly Medicines, and Apothecaries who gain by them, as if he had been ignorant of the *Materia Medica*,

or careleſs of his Patient, he did (by the Advice of a Phyſician who was his very good Friend) add to this Preſcription the Leaves of Hounds-tongue, and ſome other Things commonly reckoned to have the ſame Vertue, but not with equal Succeſs; therefore he made uſe of a purging Pill with *Opium*, which, with the daily Uſe of the abovementioned Apozem for two Months, perfectly recover'd his Patient, after the Uſe of many other Things that had been preſcribed to her in vain, and ever ſince he makes uſe of that Pill in the like Caſe.

2. By this Method we find out the beſt, quickeſt and ſureſt of thoſe Medicines to which Phyſicians aſcribe the like Vertue; as we experience the Bark of *Peru* by it ſelf to be the moſt effectual of all other Bitters in Intermitting Fevers, provided the Patient be prepared by Vomiting or Purging; for many times an Intermitting Fever is more certainly cured by Salt of Wormwood, uſed in Conjunction with Emeticks, and Bliſters, if need be, than by a precipitant Uſe of the *Cortex*; ſo that where a Cure may be ſpeedily effected, it is to be endeavoured, to vindicate Phyſicians from the Charge of Avarice or Ignorance, and to ſave the Lives of their Patients; for many are loſt, not by the Obſtinacy of the Diſtemper, or the Ignorance of the Doctor, but by their Averſion to repeat the Uſe of Medicines.

3. In preſcribing ſimple Medicines, it will be of great Uſe ſo to compound them, as they may aptly ſuit the various Indications, and thoſe are to be ſelected whoſe Vertues we have already experienced; for he aſſerts from his own Knowledge, and brings Inſtances to prove it, that the ſame Medicines have had different Effects according to the Nature of the Compoſition, or the Time of adminiſtring them.

4. By this Rule Phyſicians learn to preſcribe proper Medicines, not only in various, but even in contrary Indications, of which he gives Inſtances from his own Practice.

5. By this Method of preſcribing ſimple Medicines to ſimple Indications, a Phyſician learns rightly to apply the ſame Medicines to different Diſtempers, which he illuſtrates alſo by Examples.

6. By preſcribing Simples, their hurtful Qualities are more eaſily diſcern'd, and by Conſequence avoided, leſt the curing of one Diſtemper beget another. For Inſtance: In ſuch as are inclinable to a *Diarrhœa*, either when before the Uſe of the *Cortex* the morbifick Matter begun to diſcharge it ſelf by Stool, or did ſo abound as to provoke to Stool, the *Cortex* has not only a provoking Quality, but is capable of occaſioning a *Diarrhœa*; therefore by a too haſty Uſe of it, without the Preparations abovementioned, the Patient becomes more liable to have a Relapſe of the *Intermitting Fever*; ſo that if the Effect of any Simple be ſuch, by this Method the Phyſician is taught what contrary Medicines are to be made uſe of.

Sir *David* adds, as an Appendix to this Part, That it would be of great Uſe to the finding out the Nature and Iſſue of Diſtempers, and proper Medicines for them, if Perſons deceaſed were more frequently diſſected, and the Hiſtory of the Diſtemper wrote by the ſame Phyſician; for it is not to be doubted, but we may have great Light from the Obſervation of the Organical Parts and Humours, and even from the Defects in the Blood of thoſe who die of Fevers, or other Diſeaſes.

The next Treatiſe in this Book is about the *Febris Miliaris*, or a Fever attended with Bliſters on the Skin.

He choſe to write on this Subject; becauſe, 1. No Phyſician has treated of it at large; and though *Etmuller* has a Chapter about it in Child-bearing Women, it differs very much from our Fever of that Name. 2. Becauſe it frequently turns to a chronical and fatal Diſtemper, by the Neglect of Patients, who do not regard it at firſt, by its Continuance, or by the Phyſician's miſtaking of its Symptoms, or forbearing their Viſits too ſoon, for fear of being charged with Avarice, and prolonging the Cure. Theſe are the Reaſons which induced him to write this Treatiſe from his own Obſervations, for the Uſe of young Phyſicians, and that he might excite thoſe who are experienc'd to publiſh theirs in like Manner. To this Treatiſe he has added an Hiſtorical Collection of the ſeveral Sorts of this Fever, wherein he has religiouſly adher'd to Truth.

The

he Treatiſe conſiſts of Nine Chapters.

p. I. *Treats of the Name, Kind, and Species, of the Diſtemper.*

me derive the Name from the *Bliſters*, ch reſemble *Millet-Seed*, and appear ly in the upper Parts of the Body; but hinks it ought rather to be called *Febris ularis*, or a Bliſter Fever, becauſe the les or Puſhes are like Bladders, firſt with mpid Serum, than fill'd with whitiſh er not unlike Pearls.

e obſerves that ſome reckon none but lential and petechial or ſpotted Fevers malignant; but he differs from them, aſſigns to this Claſs, 1. All Fevers that d by Contagion; 2. All Fevers that with violent Pain in any Part of the ; 3. Thoſe in which the Animal Spire ſuddenly oppreſs'd, and ſuch as ocn ſudden Death; and all theſe Symphe has obſerv'd in the *Febris Miliaris*, h, he ſays, is as fatal to the *Indians* as *etechial Fever.*

e *Febris Miliaris* is Simple, or Comd: The Simple is when nothing but *Bliſters* breaks out, and of this Sort he s here: The Compound is when with liſters red Wheals or Puſhes are mix'd, h when alone are commonly called a Sometimes the *Bliſters* are mix'd with *mall-Pox*, and dry up by Degrees as the ſwell, but continue after the red es dry up.

p. II. *He deſcribes the* Febris Miliaris, *its Antecedents, Concomitants, and Conſeents.*

e Antecedents are a weak Conſtitution ody, either natural, or occaſioned by ive Evacuations, or a too ſpare Diet; lood is too ſerous, the Mind fearful weak, and eaſily affected by outward cts, as in Women and effeminate Men; veneſs, and deep Thought or Melan-. An Obſtruction or Ulcer in ſome with much Pain. From whence, thoſe labour under a long Cholick, the Stone, Ulcer in the Reins, and Gout, are much ct to this Fever. In Women 'tis ded by an inward Heat, either with or out Thirſt, eſpecially about the Time of -bearing, which occaſions the Child-bed Pains to be leſs violent, and the Spirits are depreſs'd without any evident Cauſe, with an Oppreſſion in the Breaſt that occaſions Sighing; and it is likewiſe preceded, as in other *Fevers*, with an external Cold.

The Concomitants are Cholick, Nephritick, Pleuretick, or Rheumatical Pains, almoſt as violent as thoſe of Child-bearing, with an Oppreſſion of the Breaſt, and Sinking of the Spirits. After theſe Pains ceaſe two or three Days, they are ſucceeded alternately by Shiverings of the whole Body, Cold and Heat, but the latter not ſo violent as in common continued Fevers, the Palm of the Hands being much hotter than the Back of 'em, the Pulſe quick, but weak, the Spirits fail much, and occaſion Sighing, as if the Breaſt were oppreſs'd with a great Weight, Sleep ſteals upon the Patient, but is ſuddenly interrupted, which is the moſt conſtant of all the other Symptoms. Many Times they paſs ſeveral Nights and Days without Sleep, and yet are neither delirious nor troubled with the Head-ach, as he ſays he knew a Woman in this Diſtemper who did not ſleep for a whole Month. The Tongue is ſometimes cover'd with a white Thruſh, at other Times looks well. The *Urine* is now and then as pale as Water, and ſometimes has its natural Colour, by which Symptom young Phyſicians are frequently deceived, and aſcribe it to Vapours. The Stomach is ſick after Sleep, and the Patient now and then has a *Diarrhœa*, either by their own Neglect, or the Unskilfulneſs of the Phyſician, who preſcribes hot Things, as uſual in Hyſterical Fits, without *Diaphoreticks*. At other Times the Patient is coſtive, and then troubled with a Looſneſs, Sickneſs in the Stomach, and Pain in the Intrails. Sometimes they have a great Thirſt, and at other Times little; and their Hands and Tongue tremble, ſo that they ſpeak as if they ſhiver'd. They are often troubled with convulſive Motions, *Deliriums*, and Difficulty of Breathing, and theſe Symptoms return with greater Violence, like the Fits of an *Intermitting Fever*. The Oppreſſion of the Breath, attended with Sighs, or a great Defect of the Spirits, without any evident Cauſe, Want of Sleep, and a Commotion of the Spirits, commonly called a *Hurry in the Head*, when the Patient compoſes himſelf to Reſt, a quick and weak

weak Pulſe, join'd with any other Symptoms, do always foretel the Breaking out of the *Puſtulæ Miliares* or Bliſters, continue till they appear, and then for moſt Part the Patient is freed from thoſe Symptoms.

Theſe *Bliſters* do for moſt Part break out in the Breaſt, Neck, and betwixt the Fingers, ſometimes on the whole Body, and increaſing by Degrees vaniſh at laſt, leaving the Skin rough. Sometimes they itch in a *Complex Fever*, where the *Red Puſhes* are mix'd with the *Bliſters*. 'Tis obſervable, the more ſimple this *Fever* is, the Symptoms are the eaſier, which frequently occaſions a Neglect, both in unwary Phyſicians and Patients, ſo that the Fever becomes either more dangerous, or is followed by another Diſtemper.

In the Declenſion of this Diſtemper, the Backs of the Patients Hands are frequently wet with a cold Sweat.

'Tis difficult to tell the certain Time when thoſe *Bliſters* appear, becauſe the firſt Beginning of this Diſeaſe, and the Accounts given of it by Patients, are ſo uncertain; but to the beſt of the Author's Obſervation, they break out for moſt Part about the 11th Day of the Fever, proceed regularly, and dry up about the 18th, or, if the Matter abound, the 21ſt or 22d.

The Conſequences of this *Fever* he reckons the Swelling of the Thighs, Legs and Feet, ſometimes with Pain; Swellings and Impoſthumes in the Teats, Decay of Memory, a too great Flux of Child-bed Evacuations or Urine, *Hypochondriac* or *Hiſterical Fits*, inward Heat and Weakneſs, attended with Languiſhing and Decay of Appetite. Theſe or ſome of them are the Conſequences, either from the Malignancy of the Diſtemper, or the Unskilfulneſs of the Phyſician.

Chap. III. *Is about the Internal Cauſes of this Fever.*

Sir *David* ſuppoſes them to be from too much *Serum* in the Blood or nervous Juices, and a certain Acrimony proceeding from too much Commotion of the nervous Juice. The Secretions peculiar to this *Fever* prove the Acidity of the Blood, for the Urine in this Caſe is not ſo high coloured, but looks more healthful, and is more plentiful than in *Burning Fevers*, when the Blood and nervous Juice is impregnated with *ſulphureo-ſaline Particles*: The Flux of Spittle is greater than in a *Burning Fever*, the Thirſt leſs, the Tongue not ſo much furr'd; the Bliſters are fill'd with *Serum*, ſeparated from the acid Humour; and this appears likewiſe from the teſtaceous abſorbing Medicines, ſuch as Crabs Eyes, *&c.* which are good in this Diſtemper; and alſo from thoſe Acids which are hurtful in it, as Lemon Juice, *&c.* The Seroſity of the Blood is alſo proved from the Heat, which is not ſo great as in a Burning Fever: For when a Raſh is mixed with the Bliſters, the Fever is more burning, and thoſe who are troubled with the Dropſy called *Anaſarca*, have their Blood full of *Serum*, and tho' they ſometimes have the *Febris Miliaris*, and the nervous Symptoms, they are ſeldom troubled with a Burning Fever. This is alſo proved by the Time of the coming out of the Bliſters, which, becauſe of the Seroſity of the Blood, and the leſſer Heat, don't appear ſo ſoon as the Raſh or the Small-Pox, where the Blood abounds more with Sulphur. For this Cauſe it is that the Animal Spirits are firſt affected in this Fever.

This is alſo proved by the Medicines made uſe of againſt this Fever, *viz.* the ſucceſſive Application of *Diaphoreticks* and Bliſter Plaiſters, which diminiſh the *Serum* and ſweeten the Acid. Beſides Nature cures this Diſtemper, by ſpending the *Serum* in the Bliſters when they come out. Nor are the ſoluting and watry Liquors ſo uſeful here as in a Burning Fever, when Chicken Broth is to be plentifully drank. Beſides all Things which hinder the Leſſening of the *Serum*, as Sweat, as outward Cold, and hot Medicines that are not *diaphoretick*, are hurtful in this Diſtemper. The Seroſity and Acidity of the Blood appears alſo by the diſſected Corpſes of ſuch as die of this Diſeaſe.

That the Diſtemper firſt begins in the nervous Liquor or Animal Spirits, is plain from the nervous Symptoms, which are the firſt that appear in this Caſe, as Pain, Depreſſion of the Spirits, Wakefulneſs, *&c.*

Chap. IV. *Treats of the Cauſes of the Symptoms.*

Moſt People, ſays the Doctor, think, that a continued acute Fever, if it be not malignant, proceeds from an Obſtruction

Glandules, eſpecially thoſe called Cuta-
s, and of the Fulneſs of the Blood Veſ-
which ariſe from thence; ſo that 'tis
y the ſame happens in this Diſtemper
e nervous Juice; for as the Nerves are
ded by the Obſtruction, the Pain,
h is the firſt Symptom of this Diſtem-
ariſes from that Extenſion; and there-
is better eas'd by *Diaphoreticks*, which
niſh the *Plethora* and Obſtruction of the
ary Nerves, than by *Laudanum*.

e nervous Juice being augmented by
Obſtruction of the Capillary Nerves,
epel'd in its Courſe, gives an irregular
on to the Animal Spirits, and makes
atient ſhiver.

t ſucceeds the cold Fit, by a more
ful Tranſfuſion of the nervous Juice
the *Blood*, when the Obſtruction is re-
d. This occaſions a quicker Motion of
lood, which abounding with ſerous
Parts, that reſtrain its Motion, the
is not ſo high as in other Fevers occa-
firſt in the Blood it ſelf, where ſaline
lphureous Particles luxuriate.

hot and cold Fits follow one another
larly, which proceeds from the Sero-
the Blood, and of the nervous Juice
ed from it, which are thereby ſooner
d, by Medicines, the Motion of the
much Speaking, or the Paſſions of the
Therefore nothing can contribute
o ſtop the Irregularity of the hot and
its than lying in Bed and Reſt.

Oppreſſion of the Breaſt and Sighing
d from the Stagnation of the nervous
in the capillary Nerves of the Breaſt,
ch the Patient is eas'd as ſoon as the
come out. It certainly does not
rom the *Serum* in the remoteſt Bran-
the *Aſpera Arteria*, for that would
n an Aſthma, and the Oppreſſion
be removed by pectoral Medicines,
are of no Uſe here, nor are any other
nder the Coming out of the Bliſters.

Oppreſſion is attended with a ſinking
Spirits, becauſe of the Seroſity of the
and the leſſer Separation of the Spi-
o the nervous Juice. It proceeds alſo
e Seroſity of the nervous Juice that
s the Spirits; for when the Serum is
h'd by Sweating, the Animal Spirits
Liberty, and the Patient recovers
Strength. 'Tis alſo obſervable, that in this Diſtemper the Pulſe is the ſame when the Spirits ſink and when they are at Liberty; but when there's too great an Evacuation, the Weakneſs of the Pulſe anſwers to the Sinking of the Spirits.

By a too great Motion of the Animal Spirits, they ceaſe from Sleep, and are frequently delirious; and when that they compoſe themſelves to Sleep, they complain of an inward Confuſion of their Senſes.

When their Head is without Pain, tho' they don't Sleep, 'tis occaſioned by the Blood's flowing towards the Brain with leſs Force; for tho' the Circulation be quicker than when in Health, 'tis ſlower than in other Fevers, and their Thirſt leſs: For the ſame Reaſon their Urine is pale, and more plentiful, and they ſpit more frequently.

From the Seroſity of the Animal Spirits, the oppoſite Muſcles are not always equally contracted, from whence proceed convulſive Motions; but if by the Seroſity abovementioned the Contraction of the Muſcles be weaker, then they have only a Trembling in their Hands and Tongue.

In the Beginning of this Diſtemper, if the Patients being deceived take it for Vapours, riſe out of Bed, and uſe hot Medicines, it increaſes the Motion of the Blood and Spirits, and inſtead of the Bliſters Nature provokes to an untimely and irregular Secretion of the Morbific Matter, from whence proceed various Symptoms, according to the various Parts it falls upon, and the Fever lurks under the Diſguiſe of ſome other Diſeaſe. If it fall upon the Stomach, it occaſions Nauſeouſneſs and Vomiting; if on the Entrails, Pains, and a *Diarrhœa*; which are ſooner eas'd by a continued Sweat, than by *Laudanum* or *Aſtringents*; and if there happen only two or three Stools, without Griping or Sinking of the Spirits, Sir *David* forbids the Uſe of Aſtringents and Opiates, becauſe frequently there's Matter enough to be voided both by Stools and Bliſters, therefore Stools don't hinder their coming out.

In the laſt Place the Pulſe becomes weak by the Seroſity of the Blood and of the nervous Juice, and then by the Paucity of the Animal Spirits, and the looſer Syſtole of the Heart.

Chap.

Chap. V. *Treats of the Prognoſticks in this Diſtemper.*

If the Patient has not obſerved a good Regimen at firſt, and the Phyſician has preſcrib'd hot Medicines, that don't provoke Sweat, tho' the Symptoms have been mild at the Beginning, the Diſtemper frequently grows worſe, and threatens either Death or the Length of the Diſeaſe.

If from the firſt any Part have been affected with Pain, the Patient hath been hot without Pain, or his Stomach ſick, and afterwards the hot and cold Fits come alternately, but at unequal Diſtances, if there happen alſo a Sinking of the Spirits, and an Oppreſſion of the Breaſt with Sighing, and an eaſy Reſpiration, and at laſt the Bliſters come out with a ſoft and continued Sweat, the Patient is in a fair Way.

A *Delirium*, *Convulſive Motions*, or an *Apoplexy*, if by the inſeparable Signs of this Diſtemper, *viz.* a great Oppreſſion of the Breaſt, with Sighs, and a Sinking of the Spirits, they ſeem to be concomitant Symptoms, and happen at the Beginning, they may be removed by Diligence and a regular Application. But if in the Progreſs and Declenſion, where the Patient is weak, and the Bliſters ſink in either by Cold or unskilful Application, they are fatally tranſpos'd to the Brain and the Nerves, and ſoon followed by Death.

In this Fever, a ſudden Suppreſſion of the *Diarrhœa*, whether of it ſelf or by the Miſuſe of *Aſtringents* or *Opiates*, it betokens an *Apoplexy*, eſpecially if the Diſtemper be attended with a *Plethory*, and the oppoſite Structure of the Parts.

Urine of a Citron Colour, which ſuddenly turns pale, is a Sign of a dangerous *Metaſtaſis*.

A *Diarrhœa* is a dangerous Symptom to Women in Child-bed, for it not only hinders the coming out of the *Bliſters*, but ſtops the Child-bed Evacuations.

Difficulty of Breathing and Speaking, the Trembling of the Tongue, but eſpecially Purſineſs, occaſioned by an Affection of the Nerves, are very dangerous Symptoms.

The more ſleepy the Patients are, the more eaſily are they cur'd.

Thoſe of a meek Temper recover b
than ſuch as are of a fierce and rugged D
poſition.

If Nature and the Phyſician co-oper
the Patient recovers as ſoon as the *Bli*
dry up, except through the abundanc
the morbifick Matter the Remainders
upon ſome particular Part of the Body.

In a *Scarlet Fever*, if the *Bliſters* c
out after the Red Colour is gone, 'tis a g
Symptom.

Chap. VI. *Is about the Cure of the Simple*
bris Miliaris.

Sir *David* preſcribes the Sweetening of
Acidity of the Blood and nervous Juice
Diminiſhing the *Serum* of 'em, and th
ſtoring or freeing of the Animal Spirits
which Method the dangerous Symptom
remov'd, and the Motion of the Blood
Spirits is brought to an *Equilibrium*;
this being done, the *Bliſters* or *Pimples* a
be expected in the uſual Time.

To ſweeten the Blood and nervous J
Alcales, and chiefly Teſtaceous Medi
are to be applied, as Crabs Eyes, Pearl
the like. To diminiſh the *Serum* at the
Time, and alſo to promote a conti
Sweat, *Goa* Stone, the Bezoar Stone,
Powder of Crabs-Shells, the Uſe of 'e
ſome Days corrects the Faults of the B
and nervous Juice, makes the Pulſe ſtr
and more even, and haſtens the comin
of the Bliſters. If there be no Occaſio
Sweating, but only to heighten the B
and Animal Spirits, hotter Cordials
Virginia Snake-Root, and the like
Wine taken plentifully; but theſe ſh
ſeldom take Place in this Fever for
ving out the Bliſters; for a more
ment Fermentation of the Blood, and
temporary Secretion of the morbific M
don't well agree, and the Uſe of hot
cines frequently occaſion *Deliriums*, C
ſive Motions, and the like. Therefore
cretions, whether made by Nature or
are beſt when they proceed ſlowly.
proved by the Uſe of Teſtaceous
cines, which together nouriſh a mo
Heat, ſweeten the Blood, and p
Sweat.

To leſſen the *Serum*, *Bliſters* are of great ſe, and likewiſe hinder the Coagulation of Blood by their *Volatile Salts*; therefore other Medicine does better ſettle the Mo- n of the Animal Spirits, promote Sleep, eaſes depreſs'd Spirits; for the morbifick tter being thus in ſome Meaſure dimi- hed, Nature more eaſily diſcharges the t in its uſual Way, ſo far is this Method m hindering the breaking out of the *Bli- s.* Nor are Bliſter Plaiſters to be ap- ed only once, but again and again, unleſs ne great Symptom forbid it, and as ſoon as e Bliſter is dry'd, another ought ſtraight- y to be rais'd; for Sir *David* has often ſerv'd, that all the Symptoms have grown rſe after the drying of the firſt *Bliſters*, t have abated upon the applying of new es.

Purging Medicines are ſeldom to be uſed this Diſtemper, unleſs ſome great Symp- n require it; but there's often Occaſion cleanſe the firſt Ways by emollient yſters.

Letting of Blood is ſeldom to be practis'd this Caſe, unleſs ſome very preſſing Symp- n require it, ſuch as an *Aſthma*, a *Pleu-* , or the like.

The Paſſions of the Mind are to be avoided this Diſtemper, and all that puts the Ani- l Spirits in Motion, whether pleaſant or pleaſant, are hurtful; and keeping in Bed to be injoin'd the Patient: For by the ntrary *Regimen* in the Beginning of this ſtemper, the Matter of the Bliſters being uck in, produces other dangerous Symp- ns; and if other Medicines be applied to ſe Symptoms than are proper for the ori- al Diſeaſe, either Death or a chronical ſtemper follows, and the *Bliſters* never ne out. Hence it is that Women in ild-bed do more eaſily recover of this ſtemper, becauſe by keeping in Bed they cure a gentle and perpetual Sweat, and nouriſh'd by Juicy Food inſtead of hot dicines; for it has often been obſerv'd, t thoſe who found themſelves well in d, have fainted and been ready to die en they got up, and ſome have drop'd off ldenly; and ſuch as leave their Beds too n, taking the Diſtemper to be only hyſte- al Fits, have grown worſe. He gives an ſtance of a Gentlewoman who did ſo, but being call'd to her when ready to die away, he order'd her immediately to be put to Bed, a Bliſter Plaiſter to be apply'd betwixt her Shoulders, and the following Bolus to be taken with a Julep every ſix Hours.

℞ *Pulv. e Chel. Canc. comp. Spermat. Ceti, a.* ℈ j. *Croci, gr.* vj. *Syr. Paralyſ. q.ſ. m.ſ. f. Bolus*; which cured her in a few Days.

He gives other Inſtances of thoſe who died by leaving their Beds too ſuddenly, for which we refer to him.

Chap. VII. *Is about Curing the Symptoms of this Fever.*

He is of Opinion, that the ſame Medicines are to be apply'd to each Symptom as if they appeared ſingly by themſelves, unleſs ſome Symptom teach the Contrary, which a skilful Phyſician will conſider.

The Pain in the Head or any where elſe, is much better remov'd by a gentle and continued Sweat, than by Opiates. As in petechial Fevers, and the ſmall Pox, the Pain is not to be remov'd till the Matter to be expell'd break out in the Skin; ſo when he is call'd to Women in Childbed, or troubled with any other Pain, and perceives a ſinking of the Spirits, and a quick but weak Pulſe, he omits Hypnoticks, and orders Diaphoreticks, but if the Violence of the Pain requires Opiates, he orders them to be mix'd with the other: Otherwiſe they either don't remove the Pain, or occaſion ſome Miſchief in its ſtead. If the Pain be Pleuretic, or there be any Inflammation, he adviſes the Letting of Blood.

As often as the hot or cold Fits return irregularly, as for moſt Part they do, a gentle Diaphoretick compos'd of *Pulv. e Chel. Cancr.* are very uſeful if taken without hot Things; and though this Medicine be contemn'd by ſome, he has frequently found it very ſucceſsful.

Want of Sleep is help'd, by applying *Bliſtering Plaiſters*, keeping in Bed, removing all Noiſe, and avoiding Uneaſineſs of Mind.

Diaphoretick Antimony taken alone is very good againſt a *Delirium*, and though

this be despis'd by some Physicians, he has often found it successful both in Want of Sleep and *Deliriums*.

Want of Sleep is also frequently cured by a gentle and continued **Sweat; and if the** abovementioned Powder don't procure it, Spirit of Hartshorn is to be preferred before all other Things; and 'tis better to take it in Sage Posset Drink, than in Infusion of Sage, because the former is more nourishing, and therefore more necessary in this Distemper.

If *Opiates* be used in this Distemper, they are best after *Blistering*; and when the Patient has a *Diarrhœa*, or the coming out of the Pimples is stop'd, *Conf. Fracastor.* or *Theriaca Androm.* are of special Use.

For Convulsive Motions, he never found any Thing better than to anoint all the Joints with Essence of Amber, and giving about twenty Drops of it in any convenient Liquor frequently.

When the Breast is oppress'd with Sighing, especially if attended with a *Convulsive Asthma*, a gentle and continued Sweat, Spirit of Hartshorn, and Blisters, are exceeding useful.

In the Sinking of the Spirits, he found nothing better than Treacle Water, either alone, or in a Vehicle with some Drops of *Sal volat. oleos.* and Powder of Saffron, especially if attended with the Palpitation of the Breast.

In Shivering or Trembling, the Animal Spirits are to be cherished with apt Medicines, especially Saffron; and nourishing Broths, especially that of Chickens.

In an universal Convulsion, occasioned by the striking in of the morbifick Matter, he has found letting of Blood by Cupping-Glasses very successful, and at the same Time order'd warm volatile Spirits to be taken by the Patients, and Glisters to be administer'd.

When the Patient is sick with a Nauseousness, and a Heat in the Breast, 'tis a Sign of the Pipp's coming out on the Tongue. These Symptoms are eas'd by a continued Sweat, till the Tongue be cover'd with Pipps; and 'tis to be observ'd, that the Blisters dry up at the same Time when the Pipps increase; and on the contrary, when the Pipps wear off the Tongue, the *Blisters* strike out, and sometimes the Remainders of the *Fever* serve to nourish the Pipps after the Blisters are dried up.

Against Vomiting, he adds to a Scruple of Powder of Crabs Shells ten Grains of Salt of Wormwood, especially if the Fits return by regular Intervals; except some Symptom, as the Inflammation of the Almonds, which is augmented by Lixivial Salts, disswade from it.

In *Diarrhœa's*, which he finds often to be augmented by Astringents, or if removed are attended with worse Symptoms, he prescribes Blisters with good Success; by which and the Use of Diaphoreticks, the serous Matter is revuls'd from the Glandules of the Intestines. He also prescribes a Scruple of Pearl by it self, or to be taken several times in some convenient Diaphoretick.

In *Chronical Diarrhœa's*, he has often found *Blistering Plaisters* to be very effectual, and gives several Instances of it.

Chap. VIII. *Treats of the* Febris Miliaris Composita, *which he describes to be when the* Blisters *are mix'd with a Rash, the Measles or Small-Pox.*

The Symptoms are almost the same as in a Continued Fever; but the Patients are more oppress'd with the Sinking of the Spirits and Sighing; they are troubled with Want of Sleep, and their Urine more like that of healthful Persons.

In a *Fever* with red Pushes, sometimes the *Pustulæ Miliares* are not only mix'd with them, but continue when they are almost dried up. In the Meazles and Small-Pox, the *Blisters* generally go before, and attend them in the Beginning.

In this Complex Fever, the Symptoms discover rather the Defects of the Blood, than of the Nervous Juice. The Pulse is quick and high, the Heat great, the Tongue dry, and the Thirst immoderate; but the Sinking of the Spirits, and frequent Sighing, are common to both Fevers.

As to the Cure where the *Pustulæ Miliares* accompany the *Meazles* and *Small-Pox*, Diaphoretick *Medicines* a little hot are safer than in the Small-Pox alone.

Outward Cold, or a *cold Regimen* of any Sort, is dangerous, and sometimes occasions sudden Death, even when most of the Symptoms promise a good Issue.

Therefore hot *Opiates*, as *Diaſcordium*, and e like, are more ſucceſsful than *Diacodium Laudanum*, as often as the *Bliſters* are join'd ith the Meazles or Small-Pox.

hap. IX. *Is about certain Diſeaſes which ſucceed this* Febris Miliaris.

There are Two which Sir *David* takes ore ſpecial Notice of, *viz.* a Swelling of e lower Parts, and a Hectical Heat.

The Swelling of the Feet and Legs, and kewiſe of the Thighs and Groin, often hapns without, but for moſt part with, great in, which precedes the Swelling which ppens by the Remains of the morbifick atter in theſe Fevers that have not been ll cured.

He preſcribes for this purging Pills, to be ken with *Opium*, or ſome Opiate every ight. The Opiate he uſes is a Pill *de Cynoſſo ad* ℈ ß and he chuſes the purging edicine according to the joint Indications. r Inſtance: When the Appetite and Diſtion are weaken'd, *Stomach. Pill. ad* ʒ ß. hen Childbed Purgations or the *Menſes* ſuppreſs'd, he uſes the *Pillula Aloephanica* or *Fœtida*, and ſometimes adds four or e Grains of the *Reſina Jalap.* and orders a raught of the bitter Decoction without a twice *per* Day. If there be Need of onger Catharticks, he preſcribes them every ght, with ſome Stomachical Decoction to taken by Day.

But if the Swelling be without Pain, he es Catharticks without Opiates; or if it end the *Febris Miliaris* only as a Symom, 'tis diſſolv'd by a Continuation of aphoreticks.

The Spirit of Scurvigraſs, both ſimple and rging, is very uſeful in this Caſe, of hich he gives ſeveral remarkable Inſtances.

A Hectical Heat, Loſs of Appetite, and ant of Vital Spirits, do frequently ſucd the *Febris Miliaris*, eſpecially if the Paent get up too ſoon. In this Caſe he preſcribes, *Salis Abſynth. gr.* x. or xv. *ex Aquæ Cadanæ Hauſtula*; and then by Degrees two ounds of the ſame Water, eſpecially if the irits ſink; and otherwiſe, two Pounds of th Water, that the Remains of the Acity left by this Fever may be voided togeer with the abovementioned Water and Salt. If the Head be offended by the Uſe of Salt of Wormwood, he orders ſome Lenitive Medicine to be taken every third or fourth Day when the Patient goes to ſleep. In this Caſe the Patient muſt eat nothing *ſalt* or *acid*, and take Care of too great Exerciſe of the Body or Mind, for fear of a Relapſe, which is alſo frequently occaſioned by a precipitant Uſe of the *Cortex Peruvianus*; in which Caſe he has preſcribed Aſſes Milk, and Teſtaceous Powders, with good Succeſs.

The reſt of the Book, which makes about one Half of it, is an Hiſtorical Account of the ſeveral Sorts of the *Febris Miliaris*, with the Methods of Cure from Inſtances of his Patients. There are 17 of theſe Hiſtorical Accounts, of which we ſhall only give the Titles, and the 6th Inſtance, which is the moſt remarkable of the whole.

1. The Hiſtory of this Fever, with an Apoplexy.
2. With a Palſy in the lower Parts.
3. With a *Delirium* and Convulſive Motions.
4. Which ended in an Apoplexy by the Uſe of *Opium*.
5. Which ended in Death by the Patient's catching Cold.
6. Where there was a ſtrange *Deliquium Animi* for two Days.
7. Which ended in a Chronical Diſtemper.
8. Which was attended with a Chronical Diſtemper, and iſſued in Death.
9. With a very large Efflux of Urine towards the End of it.
10. Which concluded with an Impoſthume in the Breaſt.
11. Which was contracted by Cold, and proved mortal.
12. Attended with a moſt violent *Delirium*.
13. Attended with Loſs of Memory.
14. Which proved fatal by taking an Emulſion.
15. Attended with an Ulcer, and Stone in the Kidneys.
16. Attended with the Small-Pox.
17. Which proved fatal, the Patient having loſt his Voice at firſt.

The 6th Inſtance abovementioned is as follows:

Sept. 12. 1697. Sir *David* was called to Mrs. *Hall*, at the *Leopard* in *Blackman-ſtreet* near St. *George*'s Church, the 9th Day after ſhe was brought to Bed. She was in the 38th Year of her Age, and this was her 6th Child. Her Conſtitution was weaken'd by her conſtant hard Labour in Child-bearing, and a frequent Colick which ſhe had lately been afflicted with, attended by hot and cold Fits, an Oppreſſion in her Breaſt, and a Sinking of her Spirits. Thoſe about her called it *Vapours*, and under this Name it went till the Day the Child was baptized, when being overcome with the Noiſe of the Company, her weak Spirits were mightily diſturbed, and ſhe was ſeiz'd with Trembling and Convulſions, and ſo very uneaſy, that her Husband could ſcarce keep her in Bed. The Day before Sir *David* was called, ſhe was taken with an univerſal Convulſion, and lay like one dead. When he came to ſee her, about 9 in the Morning, her Husband thinking her dead, left Orders that Sir *David* needed not trouble himſelf, and that he ſhould not be admitted to ſee her if he came; but Sir *David* urging the contrary, he came into the Chamber, and holding a Looking-glaſs to her Mouth and Noſtrils, found no Manner of Breath. She was as pale as Death, and lay ſtretch'd out upon the Bed, without any Motion: But upon Inquiry of thoſe about her, he conjectured, that this ſeeming Death proceeded from a Tranſlation of the morbifick Matter into all her Nerves; for he remember'd, that in little Fiſhes incloſ'd in a Glaſs, and view'd by a Microſcope, the Circulation of the Blood was viſible, tho' the Fiſh ſeemed to be dead. He thereupon forbad that the Bed-Clothes ſhould be taken off her for ſome Days, or that they ſhould bury her till the 7th, and with much ado prevailed, that Cupping-Glaſſes with Scarrification ſhould be applied betwixt her Shoulders, and on the Inſide of her Thighs; that Bliſtering Plaiſters ſhould be put behind her Ears, and upon her Wriſts; that her Temples, the Palms of her Hands, and the Soles of her Feet, ſhould be anointed with *Oil* of *Amber*; that the Juice of White Betony, and a Powder made of *Hellebore*, *Sage*, and Flowers of Betony, ſhould be blown into her Noſtrils alternately; and Draught of *Aq. Lact.* ℥ iij. *Caſtor. gr.* vj. *Artem.* ℥ vj. and an Apozem ſhould thrown into her Mouth, if poſſible, as follows:

℞ *Rad. Fragar. Chelidon. major. an.* ℥ *Fol. Fragar. M.* ij. *Flor. Paralalyſeos,* ℥ *Sem. Cardui Benedict.* ℥ j. *Bulliant. Aq. font. qſ. ad* ℔ ij. *Colaturæ adde Croci,* ℥ j. *mſ. f. Apozema, de quo ſum Cochl.* x. *ſæpe in Die.*

Almoſt two Days after, *viz.* on the 1 about 4 in the Afternoon, the Servants came to Sir *David* told him, the Surgeon, ſoon as he ſaw the Patient, ask'd with Am ment, why they would have him ap Cupping-Glaſſes to a dead Woman; obeying his Orders, he applied them to Thighs, but not to her Shoulders, ſhe ſo very ſtiff. He alſo put the Bliſters to Wriſts. In the Evening, tho' there was Sign of Breath, ſhe began to grow a li warm, and Sir *David* order'd, *Cranii Hu ni,* ℈ j. with *Aq. Rut.* and *Syr. Artemiſiæ* be put into her Mouth. On the 14th, ab 4 in the Morning, ſhe began to breath g tly, and to ſwallow down. He again ſcribed the Bliſters to be applied betwixt Shoulders, and that *Gutt.* xx. *Sal. volat.* ſhould be given her by it ſelf: Upon wh the *Puſtulæ Miliares* began to appear, an make them come out, he preſcribed:

℞ *Pulv. e Chel. Cancr. comp.* ℥ ß. *matur quarta quoque Hora e Cochl.* j. *Ju pii ſequentis, ſuperbibendo Cochl.* iiij.

℞ *Aq. Cinam. Hord.* ℥ iv. *Rutæ,* ℥ *Pæon. comp.* ℥ j. ß. *Sacchar. albiſſ. qſ. f. Julapium. Et ut bibat de Apozemat Ung. Alcis pro Potu ordinario.*

The 15th Day ſhe began to move ſpeak, and complained of her Bliſters; *Puſtulæ Miliares* came out in great Num on her Breaſt, and he continued the abo mentioned Preſcriptions.

The 16th the *Puſtulæ* grew much big and ſhe came to her Underſtanding, freed from the Oppreſſion of her Breaſt,

Faintneſs; but continuing weak, he pre-
ed as follows:

Tulv. e Chel. Cancr. comp. gr. xxv.
Lact. Alex. ℥ ij. ß. *Epidem.* ℥ ij. *mſ.*
auſtus ſexta quaque Hora ſumendus.
Rad. Scorzon. Hiſp. ℥ j. *Cort. Aurant.*
d. ʒ vj. *Fol. Galengæ, Meliſſ. an. M.* j.
Cord. an. p. j. *Sem. Card. Benedict.* ℥ ß.
in Aq. font. qſ. ad ℔ j. ß. *addendo Co-*
ræ Syr. Limon. ℥ j. *mſ. f. Apozema, de*
ſumat Hauſtum ad Libitum, & in Lan-
ibus Aq. Theriacalem.

The Patient continuing pretty well, he did not viſit her till the 19th Day, and then only preſcribed ſome bitter Stomachicks to ſharpen her Appetite, that after the 4th Night ſhe ſhould take the *Tinctura Sacra*, and next Day *Stretham* Waters, by which ſhe recover'd to every one's Admiration. By lying too much on one Hip during the Fever, ſhe had a Mortification, which being cured by the Surgeon, ſhe lived ſome Years, and died at laſt, as her Husband informed Sir *David*, of a Colick and Convulſion.

---

n Account of Animal Secretion, *the Quantity of the* Blood *in the Humane Body, and* Muſcular Motion. *By* James Keill, M. D.

THIS Learned Phyſician obſerves in his Preface, That Diſeaſes being purely Diſorders of the Animal Oeconowhatſoever can add any new Light to Knowledge of this, muſt neceſſarily r the Nature of thoſe, eſtabliſh the ctice of Phyſick upon a ſurer Foundan, and enable Phyſicians to make truer more certain Judgments in moſt Caſes. The Animal Body (ſays he) is now known be a pure Machine, and many of its tions and Motions are demonſtrated to be neceſſary Conſequences of its Structure; ſince the Animal Body is a pure Maine, and all its Actions, from which Life Health do follow, are the neceſſary Conuences of its Oeconomy, all the Symms of Diſeaſes muſt be likewiſe the neſary Conſequences of the Alteration of s Oeconomy: Therefore it demonſtrativefollows, that the greater our Knowledge the Animal Oeconomy is, the better the ture of Diſeaſes muſt be known. It muſt ceed be confeſs'd, ſays the Doctor, that s Method of improving the Art of Phyk is full of Difficulty; but the Nature of ings cannot be alter'd: If it is to be imoved, it muſt be by a Knowledge in the Animal Oeconomy, there being no other Method, but what does really, and in Effect, depend upon that; and Experience join'd to this Knowledge can only make a Phyſician: For a Phyſician ignorant of the Animal Oeconomy, is ignorant of the Structure he undertakes to regulate, and the beſt and exacteſt Hiſtory of Diſeaſes can never ſuggeſt to him any Indication of Cure. 'Tis therefore the Animal Oeconomy which alone can enable us, by reaſoning upon the Cauſes, Signs and Symptoms of Diſeaſes, to find out their Natures, and to deduce true and juſt Indications of Cure. For Inſtance: Don't all the Symptoms of the Jaundice ſhew us that the Liver is obſtructed? And don't we deduce this Obſtruction by the Knowledge of the Animal Oeconomy? And does not this Obſtruction indicate Bleeding, Vomiting, Purging, and Deobſtruent Medicines, which are uſed in curing of this Diſeaſe.

If the Animal Oeconomy were perfectly underſtood, and the Hiſtories of Diſeaſes exactly known, the right Method of curing each Diſeaſe might be evidently and certainly deduced: Therefore when the Hiſtory of a Diſeaſe is exactly known, if the right Method of curing it cannot be deduced, it muſt be

be becauſe the Animal Oeconomy is not underſtood.

This Oeconomy is it ſelf a conſiderable Part of Natural Philoſophy, and our Bodies are ſtrongly influenced by Variety of Diets, and ſo many Things from without, that indeed the whole Study of Nature ſeems to be uſeful to him that would underſtand it.

This Book contains a few Thoughts about ſome of the principal Parts of the Animal Oeconomy. It was the Conſideration of the Uſe of the *Vena Portæ*, which gave the Doctor the firſt Hint to think, that the ſeveral Humours of the Body were form'd by the Attraction of the Particles of the Blood.

The Doctor, in explaining how the ſeveral Fluids of the Animal Body are ſeparated from the Blood, ſhews, 1. How they are form'd in the Blood before they come to the Place appointed for Secretion: 2. Demonſtrates in what Manner they are ſeparated from the Blood by the Glands.

The Blood of Animals, when drawn out of the Body, does naturally divide into two different Parts; the Red, which does in a little Time coagulate; and the *Serum*, which remains fluid. In a Drop of Blood view'd with a Microſcope, we ſee a Number of red Globules ſwimming in a limpid Fluid, and perceive how the Globules attracting one another unite like Spheres of Quickſilver, which, as they touch, run into one another, and conſequently the Blood divides into two Parts. After the Coagulation of the Red, if we examine the *Serum* with a Microſcope, we find in it likewiſe a great Number of Corpuſcles of various Figures and Magnitudes ſwimming in a limpid Fluid. Theſe don't attract and unite with one another, as the former did, till ſome Part of the Fluid in which they ſwim has been evaporated by Heat, and then they likewiſe attract one another, and form a *Coagulum*, as the Globules did.

This therefore is Matter of Fact, that the Blood conſiſts of a ſimple and limpid Fluid, in which ſwim Corpuſcles of various Figures and Magnitudes, and endued with different Degrees of an attractive Force. Now of ſuch Particles as the Blood conſiſts, muſt the Fluids be compoſed which are drawn from it; and as in the Blood the Particles attract one another and cohere together, ſo likewiſe may the Particles of the Fluids which are ſeparated from it.

Moſt of the Liquors we know are formed by the Coheſion of Particles of different Figures, Magnitudes, Gravities, and attractive Powers, ſwimming in an aqueous Fluid, which ſeems to be the common *Baſis* of all. Why are there ſo many Sorts of Waters differing from one another in Properties? Is it not becauſe of the Corpuſcles of Salts or Minerals with which the Element is impregnated? What elſe is Wine but Water impregnated with the Particles of the Grape, and Ale with Particles of Barley? Are not all Spirits the ſame Fluid ſaturated with ſaline or ſulphureous Particles? And all Liquors are more or leſs fluid, according to the greater or ſmall Coheſion of the Particles which ſwim in this aqueous Fluid; and there is hardly any Fluid without this Coheſion of Particles, as is apparent by the Bubbles which ſtand upon the Surface of Water, Wine, and even of ſome Spirits.

But that ſome of the Fluids which are ſecern'd by the Glands from the Blood, are actually compoſed by the Coheſion of ſeveral Sorts of Particles, is very evident. We know, that in Milk there are three or four ſeveral Sorts of Subſtances, and yet when examined by the Microſcope, it appears the Blood to conſiſt of very ſmall Globules ſwimming in a limpid Fluid. Urine has the ſame Appearance, and contains perhaps many Principles; and there is no Doubt, but the Tears, Spittle and Sweat, are all compounded Liquors. If ſome of the Fluids which are ſecreted by the Glands are not eaſily reſolved into their compounding Parts, we can the more conclude from thence that they are not compounded, than we can that the Blood is not, becauſe it does not ſeparate into above 30 different Fluids, of which it is compoſed, and which are conſtantly extracted from it by the Glands.

If the Particles which attract one another are ſtill more powerfully attracted by the Particles of the Fluid in which they ſwim than by one another, they can never ſeparate themſelves ſeparate from the Fluid; and this is the Caſe of all Salts diſſolv'd in a large Quantity of Water, and of Urine when

er breaks nor ſettles. But if the Parti- which ſwim in the Fluid are more gly attracted by one another than by Fluid by which they ſwim, then this muſt neceſſarily go into Parts, and the uſcles uniting will either ſink, ſwim, cend, in the Fluid, according to their ick Gravities, unleſs there ſhould be ſo Interſtices within the coagulated Maſs ll receive the greateſt Part of the Fluid. hence it is plain, that the red Part of lood conſiſts of Particles which attract another more than they do the watry in which they ſwim, and that the Particles which are in the watry Fluid e *Serum* are more attracted by it than ne another: But if Part of this watry be evaporated, by this Means the Par- attracting approaching nearer, the Force heir Attraction is increas'd, and then unite, and conſequently this Force muſt uch ſtronger in Particles that are very one another than when they are at a nce. This Power by which Particles of Blood attract one another, is the ſame that which is the Cauſe of the Cohe- of the Parts of Matter; and ſince it appear, that the whole Animal Oeco- does likewiſe depend upon this at- ve Power, it ſeems to be the only Prin- from which there can be a ſatisfactory ion given of the *Phænomena* produced he *Minima Naturæ*, as that other at- ve Principle, which is of a different from this.

om this Principle, that the Blood con- of Corpuſcles of various Figures and itudes, and endued with various De- of an attractive Power, and that of Particles the Fluids ſecern'd by the ds are compoſed, the Doctor endea- to ſhew, how the Corpuſcles that oſe the Secretions are form'd in the before they arrive at their ſecerning ds; and for this End he lays down the wing Propoſitions or Laws of Attraction, at preſent he has Occaſion for, the being contained in his Brother's Theo- publiſhed in the *Philoſophical Tranſ-*.

op. I. *There is a Power in Nature by each Particle of Matter attracts every other Particle, with a Force that increaſeth in a greater Proportion than that by which the Squares of the Diſtance increaſe*, viz. *in a reciprocal, triplicate or quadruplicate Proportion to the Diſtances.*

For were the Particles that compoſe the attracting Body endued with a Power that attracted only with a Force reciprocal to the Squares of the Diſtances, the Attraction would not be much ſtronger at the Contact than at ſome determined Diſtances from it. The Doctor inſtances in the Caſe of Gravity, which ariſes from a Power of attracting reciprocally, as the Squares of the Diſtances, Bodies being of the ſame Weight when they touch the Earth, as they are at 100 Feet Diſtance. But by all Experiments, this Power is much greater at the Contact, or extremely near it, than at any determined Diſtance. The Particles of Salt diſſolv'd in a large Quantity of Water do not ſenſibly attract one another, till that Part of the Water has been evaporated; by which Means approaching each other, their attractive Force increaſes, they run to one another, and uniting, form Cryſtals, whoſe Parts have a ſtrong Coheſion: And therefore the Force by which each Particle attracts every other Particle, muſt increaſe in a much greater Proportion than that by which the Squares of the Diſtances decreaſe.

Prop. II. *The attractive Force is* cæteris Paribus *proportional to the Solidity of the Particles.*

The attractive Force of a Particle is compoſed of the Sum of all the Attractions of the Parts of that Particle. Now theſe Parts are moſt numerous in the moſt ſolid Particles; and therefore *cæteris Paribus* their attractive Force is ſtrongeſt.

Schol. This Proportion is to be underſtood of the ſmalleſt Particles of Matter, and not of the Corpuſcles made up of thoſe Particles: For Corpuſcles may be ſo compounded, that the moſt ſolid and compact Particles may make up the lighteſt Corpuſcles, if the Interſtices between the Particles be large, ſo that few of them may be diffuſed through a great Space. Such a Corpuſcle, tho' it conſiſts of Particles that are endued with a ſtrong

ſtrong attractive Power, may yet be ſuperficially lighter than another which conſiſts of Particles not ſo ſolid, but cloſer together; and of ſuch Sort of Corpuſcles all Salts are conceived whoſe Particles of the laſt Compoſition are very ſolid, but that there are great Interſtices between thoſe Particles, into which the Water running with a Force, being ſtrongly attracted, diſſolves the Texture of the Corpuſcles.

Prop. III. *If Particles of Matter attract each other with a Force that is in a reciprocal, triplicate or a greater Proportion of their Diſtances, the Force by which a Corpuſcle is drawn to a Body made up of ſuch attractive Particles, is infinitely greater at the Contact, or extremely near it, than at any determined Diſtance from it.*

Prop. IV. *If a Body conſiſts of Particles attracting with a Force that is in a reciprocal Proportion to the Cubes of the Diſtances, or in a greater; and if this Force is not infinitely greater than the Force of Gravity at the Point of Contact, or extremely near it, at any determined Diſtance from the Point of Contact it muſt be infinitely leſs than the Force of Gravity.*

Prop. V. *The Force by which the Particles of Matter attract each other when extremely near the Contact is not infinitely greater than the Force of Gravity.*

Prop. VI. *A large Particle attracts not more ſtrongly than a ſmall one of the ſame Solidity; but a Diverſity of Figures cauſeth different Degrees of Attraction in Particles that are otherwiſe the ſame.*

Prop. VII. *If Particles ſwimming in a Fluid attract one another more ſtrongly than they do the Particles of the Fluid, the Force by which they come to each other will be that by which their attractive Force exceeds the attracting Force of the Fluid.*

Prop. VIII. *If Particles ſwimming in a Fluid are more attracted by the Fluid than by one another, with a Force that will be equal to the Difference of their mutual Attraction, and the Attraction of the Fluid.*

Prop. IX. *The Force by which Particles attracting one another cohere, is greater* cæteris Paribus *where the Contact is greater.*

Prop. X. *If the attracting Corpuſcles are elaſtick, they muſt neceſſarily produce an inteſtine Motion, greater or leſſer, according to the Degrees of their Elaſticity and attractive Forces.*

Prop. XI. *Particles attracting one an... in a Fluid moving either with a ſwift or ſlow... greſſive Motion, attract one another juſt the... as if the Fluid was at Reſt, if all the Par... move equally; but an unequal Velocity of... Particles does mightily diſturb their Attrac...*

Theſe are the Laws by which Secreti... are firſt form'd in the Blood, before they... ſeparated by the Glands. The Particle... the Blood returning by the Veins, mutu... attract one another, and cohering, form G... bules too big for any Secretion; and th... fore there was an abſolute Neceſſity that t... ſhould be broken and divided in the Lu... by the Force of Reſpiration; which, ... cauſe it is commonly thought to be incon... derable, by reaſon we are not ſenſible of... the Doctor here makes an Eſtimate of.

'Tis demonſtrated by the Writers of H... droſtaticks, That Weights which force ... of the ſame Tube equal Quantities of ... ſame Fluid, are to one another as the Squa... of the Times the Fluid is forced out in: ... if the Times are equal in which the ſa... Quantity of the Fluid is forced out thro... unequal Tubes, then the Powers are ... procally as the Orifices of the Tubes: A... therefore Powers which thruſt out the ſa... Quantity of a Fluid through unequal Tu... are to one another in a reciprocal Propor... compounded of the Squares of the Times ... Orifices of the Tubes.

In order to know by what Force the ... is thruſt out of the Lungs in Expiration, ... Doctor ſays, he took a thin Hog's Blad... which he could eaſily blow up with ... Breath of one Expiration, and ha... moiſten'd it, that it might neither reſiſt ... Air in blowing up, nor the Weights w... were laid upon it, he fix'd a ſmall T... whoſe Diameter was one tenth Part of ... Inch, to the Neck of the Bladder; then ... ling the Bladder with Air, he put a We... of half a Pound four Ounces on the ... of it: And having repeated the Experi... ſeveral times, he found that this We... ſqueez'd all the Air out of the Bladder t... the ſmall Tube in the Space of 25 Vi... tions of a *Pendulum*, which vibrated Sec... of a Minute.

By this Experiment, he ſuppoſes ... 1600 Ounces, equal to 100 Pound, ...

ce by which the Air is thruſt out of the ngs every Expiration: But ſince Action Reaction are equal, the Preſſure of the upon the Lungs every Expiration is equal he Preſſure of an hundred Pound Weight. the Gravity of the Air was always the e, and if the Diameter of the *Trachea eria* and the Time of every Expiration re equal in all, this Weight upon the ngs would always be the ſame. But ſince find by the Barometer, that there is three hes Difference between the greateſt and leaſt Gravity of the Air, which is one th Part of its greateſt Gravity, there muſt likewiſe the Difference of ten Pound eight in its Preſſure upon the Lungs at one ne and another; for the *Momenta* of all dies moved with the ſame Velocity are as ir Gravities. This is a Difference which h as are Aſthmatick muſt be very ſenſible eſpecially if we conſider, that they like- ſe breath thicker, that is, every Expira- n is performed in leſs Time; if in half Time, and the ſame Quantity of Air wn in, then the Weight of the Air upon Lungs muſt be Four hundred Pound, of ich one tenth Part is forty Pound; and nſequently Aſthmatick People, upon the ſe or Fall of the Barometer, feel a Diffe- ce of the Air almoſt equal to half its ſſure in ordinary Breathing. Again, if *Trachea Arteria* is ſmall, and its Aper- e narrow, the Preſſure of the Air increaſes the ſame Proportion as if the Times of piration were ſhorter; and therefore a ill Voice is always reckoned amongſt the gnoſtick Signs of a Conſumption, be- ſe that proceeds from the Narrowneſs of *Larynx* or *Trachea Arteria*, and conſe- ntly increaſes the Preſſure of the Air up- the Lungs; which, upon every Expira- n, beats the Veſſels ſo thin, that at laſt y break, and a Spitting of Blood brings a Conſumption apace.

The Doctor ſuppoſes, that no Body doubts ether this Preſſure of the Air upon the ngs be ſufficient to break the Globules of Blood, and to diſſolve all the Coheſions y might contract in their Circulation o' the Arteries and Veins: And when the od is thus diſſolv'd and thrown out by Heart into the *Aorta*, 'tis evident, that Reunion of the Particles requires more or leſs Time according to their attractive Powers, even tho' they all moved with the ſame Velocity, and in the ſame Direction. But this doth not happen; for a Fluid moves thro' a Cylindrical or Conical Veſſel (ſuch as the Arteries are) with a greater Velocity at the Axis than at the Sides. And again, the Blood is thruſt into the *Aorta* by the whole Force of the Heart, and Fluids, when they are preſs'd, preſs *undequaque*; by which Means the Arteries are dilated, and the Blood moves not only forwards, but likewiſe preſſes perpendicularly on the Sides of the Arteries; and as the Sides of the Arteries (being elaſtick) return, they preſs the Blood from them every Way, which muſt produce an inteſtine Motion, and by the 11th Propoſition hinder the Attraction of the Particles, and by this frequent and ſtrong Colliſion of the Particles of the Blood againſt the Sides of the great Arteries, the Coheſions of the Particles, if there be any, will be immediately diſſolv'd. Again, this inteſtine Motion muſt greatly increaſe, upon the Account that many of the Particles of the Blood are elaſtick; for by this Reſiſtance of the Sides of the Veſſels, they muſt neceſſarily hit one againſt another, and being elaſtick, reflect from one another, and ſo increaſe the inteſtine Motion of the Blood by the 10th Propoſition. Upon this inteſtine Motion depends the Heat of the Blood, which therefore is every where proportional to the *Impetus* of the Particles againſt the Sides of the Veſſels, ſuppoſing the Elaſticity of the Particles every where the ſame. Now the *Impetus* of the Particles againſt the Sides of the Veſſels decreaſes as the Sum of the Cavities of the Veſſels increaſes; and conſequently where the Sum of the Cavities of the Veſſels is greateſt, there the inteſtine Motion of the Blood is leaſt, and the attractive Power of the Particles is *cæteris Paribus* greateſt.

The Doctor obſerves, that Steel being an elaſtick Body, heats the Blood more than any other Mineral, and that the Force of its own Particles in removing Obſtructions, as well as thoſe of the Blood, increaſe; and therefore 'tis a better Deobſtruent than ſome other Minerals of a greater Gravity.

The Particles which unite firſt after the Blood is thrown out of the Heart into the Great Artery, muſt be ſuch as have the

ſtrongeſt attractive Force; ſuch as have the leaſt unite laſt, and the intermediate ones according to their Natures. The Particles endued with the ſtrongeſt attractive Powers are by the 2d and 6th Propoſition the moſt ſolid ſpherical Corpuſcles, and the Quantity of their Contact being the leaſt by the 9th Propoſition, the Secretion which they compoſe muſt be the moſt fluid, and ſuch is the Liquor in the *Pericardium*.

The Salts are Corpuſcles that are ſtrongly attracted, and have a moſt cloſe Union with the Fluid of Water; for the Doctor obſerves, that tho' the Lungs may divide the Particles of Salt from one another, yet ſtill they firmly adhere to the aqueous Humour in which they ſwim, and therefore they may likewiſe at firſt be drawn off; upon which Account the Kidneys have their Situation ſo near to the Heart. And indeed, they could not have been placed at a greater Diſtance, and have ſeparated ſuch a Quantity of Urine as now they do, not only upon the Account of the great Quantities of Blood they receive where they are; but likewiſe, becauſe if they had a more diſtant Station, other Particles muſt have united with the Salts and aqueous Particles, (as in their preſs'd Station ſome terreſtrial Particles do;) and conſequently the Urine could not have been diſtilled ſuch as it is now, or at leaſt but in a ſmall Quantity.

The Corpuſcles which are the ſloweſt in uniting muſt be ſuch as have the weakeſt attractive Force, which by the 2d and 6th Propoſition are ſuch as have the leaſt Solidity, and ſuch as have their Surfaces the moſt extended; and therefore Corpuſcles which have plain Surfaces are longer in uniting than ſpherical Corpuſcles; but when united, they cohere more ſtrongly by the 9th Propoſition, and compoſe the moſt viſcous Fluids; and therefore the moſt viſcid Secretions, ſuch as the Mucilage of the Joints, are ſeparated at the greateſt Diſtance from the Heart. Where the Sum of the Cavities of the Arteries is greateſt, the *Impetus* of the Blood againſt the Side of the Veſſels (which is always proportioned to the Velocity of the Blood) is ſmalleſt, and conſequently where the Particles move almoſt with an equal Velocity; and therefore the Attractions of the weakeſt are not diſturbed by the 11th Propoſition.

Since the Gall which is ſecern'd by the [Li]ver, and the Seed by the Teſticles, ſeem'd [to] be two conſiderable Objections againſt [wh]at the Doctor advanced, he ſays, they are [ſo] far from proving any Thing againſt [the] Doctrine of Secretions, that they are [the] greateſt Arguments that could poſſibly [be] uſed for the Truth of it. Nothing (ſays he) does more evidently demonſtrate the Intentions of Nature in her Operations, than the various Methods ſhe is ſometimes forced to take to bring the ſame Thing about.

This is eminently remarkable in the Secretion of the Gall, which being to be mixed with the Chyle as it comes out of the Stomach into the *Duodenum*, would no where be ſo conveniently ſecern'd from the Blood as where the Liver is placed. Now had the Branches of the Cæliack Artery carried all the Blood to the Liver, from which the Gall is to be ſeparated, 'tis evident, conſidering the Nearneſs of the Liver to the Heart and the inteſtine Motion of the Blood, that ſo viſcid a Secretion as the Gall is could never have been form'd in the Blood, and conſequently could never have been ſecreted by any Gland in that Place. In this Caſe, Nature is forced to alter her conſtant Method of ſending the Blood to all the Parts of the Body by the Arteries. Here ſhe forms a Vein which is no Branch of the *Vena Cava* as all the other are, and by it ſhe ſends the Blood from the Branches of the Meſenterick and Cæliack Artery, after it has paſſed through all the Inteſtines, Stomach, Spleen, Caul and *Pancreas*, to the Liver. By this extraordinary Continuance, the Blood is brought a great Way about before it arrives at the Liver, and its Celerity is extremely diminiſhed, that all the Corpuſcles which are to form the Gall may have ſufficient Time to attract one another, and unite before they come to the ſecerning Veſſel. Thus (ſays the Doctor) we have found out the Uſe of the *Porta*, which, notwithſtanding it makes ſo conſiderable a Figure in the Animal Body, yet perhaps no Part was ever leſs minded, or had its Uſe leſs underſtood, by the Writers upon the Animal Oeconomy.

But that this is moſt certainly the Uſe of the *Porta*, will more evidently appear, if we conſider what Nature ſtill does further in Proſecution of the ſame Deſign. The Gall

es of all the Arteries increaſe as they di-
e. The Sum of the Branches which riſe
nediately from the *Aorta* is to the ſame as
740 to 100000. But as if this Propor-
was too little to effect the Deſign of
ture before the Blood arrives at the Li-
the Branches which immediately ſpring
n the Trunk of the Meſenterick Artery
reaſe in a much greater Proportion. The
ure of this Artery, as it lies in the Mid-
of the Meſentery, is repreſented by the
ctor after this Manner.

And in that Body, from which he took the
lowing Proportions, he found 21 Bran-
s to ſpring immediately from its Trunk.
adds, that in ſuch Parts of which the
nk of the Meſenterick Artery is 15129,

Firſt Branch is,	2136
Second,	1936
Third,	2136
Fourth,	2104
Fifth,	4489
Sixth,	1936
Seventh,	2601
Eighth,	3136
Ninth,	1681
Tenth,	3025
Eleventh,	625
Twelfth,	1369
Thirteenth,	1024
Fourteenth,	1849
Fifteenth,	1936
Sixteenth,	529
Seventeenth,	729
Eighteenth,	1156
Nineteenth,	1024
Twentieth,	1156
Twenty firſt,	841
The Sum of all,	37418

By theſe Proportions he makes it appear, that the Sum of the firſt Branch is much more than double to the Trunk of the Meſenterick Artery; and therefore the Velocity of the Blood in them is much leſs than half what it is in the Trunk. But becauſe the other Branches do not exceed one another ſo much, he therefore ſuppoſes, that the Branches are only double to their reſpective Trunks, and that there are only ſix Series of Diviſions between the Trunk and the Evaneſcent Artery; whereas moſt of the Branches have ſo many Series whilſt they run upon the Meſentery, and many more upon the Inteſtines; ſo that what he perhaps exceeded in reckoning the Branches double to their Trunks, is more than made Amends for in ſuppoſing ſo few Diviſions. Now from this eaſy Suppoſition, the Velocity of the Blood in the ſeveral Series will decreaſe in the ſame Proportion as the Increaſe of 2, 4, 8, 16, 32, 64. And therefore the Doctor concludes, that the Velocity of the Blood in the Evaneſcent Artery will be 64 times leſs than it is in the Trunk of the Meſenterick.

As the Trunk of the Meſenterick Artery bears a leſſer Proportion to its Branches than the *Aorta* does to its Branches, ſo the Branches of the Meſenterick Artery are leſs in Proportion to their Conjugate Veins than the *Aorta* is to the *Vena Cava*. The Deſcending Trunk of the *Aorta* below the Emulgents is to the *Vena Cava* at the ſame Place as 324 to 441. But a Branch of the Meſenterick Artery is to its correſponding Branch of the *Porta* as 9 to 25, and therefore the Blood in the Branches of the *Porta* moves above 177 times ſlower than it does in the Trunk of the Meſenterick Artery, and that only upon the Account of the Increaſe of the Diameters of the Veſſels; ſo neceſſary was it to abate the rapid inteſtine Motion of the Blood, which might hinder the Coaleſcence of the Particles for the Formation of the Bile. The Blood is indeed no where without an inteſtine Motion; but where the Sum of the Cavities of the Blood-Veſſels is greateſt, there the inteſtine Motion being moſt languid, the Particles which hit againſt one another don't reſile, but unite together; and a very languid inteſtine Motion, by bringing Particles nearer to one another,

which otherwiſe would not have come together, conduces to increaſe the Combination of Particles.

He proceeds next to conſider what Care Nature has taken of the Blood which is convey'd by the Cæliack Artery to the Liver; for it ſeems it was neceſſary to ſend a larger Quantity of Blood to the Liver than could be diſpoſed of thro' the Inteſtines. Part of the Blood of the Cæliack Artery is beſtow'd upon the Stomach and Caul, and its Velocity diminiſh'd (as has been ſhewn) in the Inteſtines; but ſtill all the Blood which theſe Parts could receive was not ſufficient for the Liver, and there being no more Room for the Diviſion and Expatiating of the Veſſels through ſuch a large Space as the Meſentery and a long Tract of Guts, Nature, in order to abate the Velocity of the reſt of the Blood (to which the inteſtine Motion is proportional) empties the Blood entirely out of the Veſſels into a large ſpongy Bowel, or rather Ciſtern for that Purpoſe. Our Author does not know the Dimenſions of the Splenick Artery; but the Circumference of the Cæliack being half an Inch, or 5, and its Square 25, he thinks that the Square of the Splenick, which is a Branch of it, cannot be above 18. He adds, that the Dimenſions of the Spleen are 6 Inches in Length, 3 or 4 in Breadth, and 2 in Thickneſs; and ſuppoſing it to be a Cylinder of 2 Inches Diameter, and the Square of its Circumference 36, he concludes, that the Blood moves 200 times ſlower in the Spleen than in the Beginning of the Splenick Artery, and is longer before it gets to the Liver than that which paſſes thro' all the Inteſtines.

All this makes it evident to a Demonſtration, that the Intent of Nature was to diminiſh the Velocity of the Blood, that ſuch a ſlow Motion was abſolutely neceſſary for the ſecuring the Bile in the Liver, and that if the Humours which are ſeparated by the Glands are at all Times and Places the ſame in the Blood, and not found after the Manner demonſtrated, there was no Need for ſo conſiderably diminiſhing the Velocity of the Blood, ſince, let this move faſt or ſlow, they would always be the ſame, and in an equal Aptitude to be ſecern'd.

Then he ſhews, that the Particles which compoſe the Bile bear a very ſmall Propo[rtion] tion to the reſt of the Blood, from the gr[eat] Quantity of Blood carried to the Liver, [and] the ſmall Quantity of Bile ſeparated by [it]. He inſtances in a large Dog, whoſe *Di[ctus] Cholidochus* was near as big as a Man's, [and] which he could never gather above 2 Dr[ams] in an Hour: But he ſays, there's thrown [up] to the *Aorta* every Hour about 4000 Ou[n]ces of Blood, and that the Meſenterick [and] Cæliack Arteries are to the reſt as 1 to 8, [ſo] that 500 Ounces of Blood are carried ev[ery] Hour to the Liver; and ſince only 2 Dr[ams] of Bile are ſeparated from it, the Bile m[uſt] be to the Blood at leaſt as 1 is to 2000. T[his] therefore this ſmall Proportion of the Bile [to] the Blood made it ſo neceſſary to allow [ſo] much Time for the Attraction of the Par[ti]cles which form the Bile. Beſides, the Blo[od] paſſing through ſo many different Parts b[e]fore it comes to the Liver, parts with m[uch] of its *Lympha*, by which Means the Partic[les] that compoſe the Bile approaching near[er] one another, are by mutual Attraction ſoo[ner] united. The Doctor adds, that both th[eſe] Conſiderations highly confirm the Truth [of] this Theory of *Secretion*; for the Diminu[tion] of the Velocity of the Blood, and the Sub[ſ]traction of the *Lympha*, can agree in [no] other End than the uniting the Particles [of] the Bile.

As to the Objection about the Formation of the Seed, the Doctor ſays it further m[a]niſeſts the Truth of this Doctrine of Secr[e]tions, and that Nature purſues the ſame I[n]tentions, though in a different Manner, th[e] Structure of the Parts not allowing either [of] the former Contrivances.

The Blood (he ſays) is carried to th[e] Teſticles by the Spermatick Arteries, which contrary to the conſtant Method of Natur[e] in framing the other Arteries, are ſmalle[r] where they ſpring from the Trunk of th[e] Great Artery, and immediately dilate to [a] conſiderable Bigneſs; which evidently ſhew[s] there could be no other Deſign in it but [to] retard the Velocity of the Blood: For [it] cannot be ſuppoſed, that the only Intention was that a ſmall Quantity of Blood might go to the Teſticles, becauſe then there ha[d] been no Occaſion for giving the Artery a different Figure from all others; that nat[ure]

Orifice would have been ſufficient of it for that Purpoſe, which the Wideneſs he Artery immediately afterwards does ner hinder nor further. The Orifices of Spermatick Arteries were ſo ſmall, that Doctor ſays he could not meaſure them n he did the other Arteries, and yet as as ever they are paſs'd the *Aorta*, they e as big, if not bigger, than one of the bals, which is 434, 2. Now ſuppoſing Orifices to be each 17, 3. then the d will move 25 times ſlower where Artery dilates than it does at the Orifice. n, we conſtantly find that all the Parts he Body are ſupplied with Blood by l Arteries from the neareſt Trunks. If Method had been obſerv'd in ſending Blood to the Teſticles, they had received Arteries from the Iliacks, and they had but a little Way before they had come e End of their Journey: But inſtead of two ſmall Arteries are made to ariſe the *Aorta* a little below the Emulgents, to march above a Foot before they come e Teſticles. Now granting that the Ve- y of the Blood in the Spermatick Ar- is 25 times ſlower than it is at its Ori- *i. e.* in the *Aorta*, and that the Velocity he Blood in the Iliacks can be but very leſs than it is in the *Aorta* where the maticks ariſe, the Blood muſt move 25 s ſlower to the Teſticles than if it had after the ordinary Manner from the ks; and becauſe the Space it runs thus ly is at leaſt 6 times longer than if it gone from the Iliacks, therefore it muſt 50 times longer in going to the Teſticles if it had gone according to the com- Courſe of Nature; ſo that the inteſtine ion of the Blood is not allay'd, but ſuf- nt Time is afterwards allow'd the Parti- which are to compoſe the Seed, to attract coaleſce before they arrive at the Teſti-

it be objected, That the *Mucus* of the , and the Wax of the Ear, are ſeparated e the Blood is not ſo languid as their idity ſeems to require; it is anſwer'd, they are Fluids which fall into open ges, where the Air having free Admiſ- carries off Part of their aqueous Fluid, the Remainder becomes thick, as the of the Blood does when heated. Beſides, 'tis to be obſerv'd, that though the Coheſion of the Particles depends upon their Figures, yet the Force by which they attract one another is likewiſe in Proportion to their Solidities; ſo that tho' Particles of equal Magnitudes and ſimilar Figures may cohere equally ſtrongly, yet the moſt ſolid will ſooneſt unite. Hence it is, that of two Fluids equally viſcid, the heavieſt may be ſeparated in Glands nearer to the Heart than the other; and that two Fluids of different Viſcidities may be ſeparated at the ſame Vicinity to the Heart, if the Quantity of the Contacts of the Particles be ſuch as will make Amends for their Want of Solidity.

Moſt, if not all, the Secretions contain a greater or leſſer Proportion of the aqueous Fluid, which makes them more or leſs viſcid; yet that which contains the greateſt Quantity may conſiſt of Particles endued with a very ſmall and ſlow attractive Force, and conſequently ſuch a Fluid cannot be ſeparated by any Gland ſo near the Heart, as that which has a leſs Proportion of the aqueous Fluid, and which conſiſts of Particles endued with a ſtronger attractive Force; and this laſt Fluid may be much more viſcid than the other whoſe Particles are more dilated by the watry Fluid.

But that the different Viſcidities of the Secretions do not depend only on the greater or leſſer Proportion of the aqueous Fluid, is evident from the foregoing Propoſitions, unleſs any one can ſuppoſe that the Blood conſiſts only of one Sort of Particles; which Suppoſition, beſides that it contradicts Matter of Fact, can never account for the Secretion of ſo many different Fluids: And that the Diverſity of the Attractions in the Particles, is the Reaſon why various Velocities of the Blood, and Diſtances from the Heart, are required for ſecerning of different Liquors, is moſt evident from what has been ſaid concerning the Bile and the Seed. If only a greater or leſſer Proportion of the aqueous Fluid had been requiſite for ſeparating of different Sorts of Fluids, that might have been done any where, as the Doctor ſhews hereafter, and Nature had not been put to ſo many Shifts and Contrivances as we have already ſeen.

As ſome Fluids are only to be ſeparated in certain Velocities of the Blood, and at cer-

tain

tain Diſtances from the Heart, ſo there may be others that may be ſeparated any where, and in any Velocity of the Blood. Theſe are ſuch as conſiſt of Particles always in an equal Aptitude to be ſecern'd; and tho' ſome of them may contain ſeveral Sorts of Particles, yet the Nature of theſe Fluids does not depend upon the Attraction and Coheſion of their Particles. Such Sort of Secretion is the *Lympha*, which is a watry Fluid, ſecern'd in all Parts of the Body, for making the Chyle more liquid. If it be ſaid, that ſince the *Lympha* might have been ſeparated any where, and that it ſerves only to dilute the Chyle, that there ought to have been a particular Gland ſomewhere for it in the *Abdomen*, as being the more proper Place: He anſwers, that a large Quantity of *Lympha* was neceſſary for diluting the Chyle, as appears by the numerous Lymphæducts which diſcharge themſelves into the *Receptaculum Chyli*, *Ductus Thoracicus*, and *Subclavian Veins*; and if ſuch a Quantity had been ſeparated by a Gland or Glands in the *Abdomen* appropriated to that Uſe, they muſt have had very large and conſiderable Arteries. The Liver has one 8th Part, and the Kidneys near one 8th more of the whole Blood which paſſes through the *Aorta*; and if the Lymphatick Glands had had one 8th Part more, (which is the leaſt they could have had) theſe three Parts would have had near one half of the Blood, and the other half muſt have ſerv'd all the reſt of the Body, which would have been a very unequal Diſtribution of the Blood. Beſides, Nature is always very ſimple and frugal in her Operations; ſhe never is at any unneceſſary Trouble: And the Doctor propoſes to ſhew in the Second Part of this Treatiſe, how the *Lympha* may be drawn off by Glands appointed to ſeparate other Fluids; ſo that for this Operation ſhe makes no Part, and is at no Expence of Blood, whereas ſhe muſt have been at a very great one, if ſo much *Lympha* had been drawn off by appropriated Glands.

The Doctor ſuppoſes the Animal Spirits to be another Fluid of this Kind. He is poſitive that they conſiſt of by far the ſmalleſt Particles in the Blood, becauſe of the Minuteneſs of their ſeeming Glands; and therefore they not being form'd by the C heſion of other Particles, might have b ſeparated any where. Yet the Animal Oe nomy receives a great Advantage by the d ſtant Station of the Brain from the Hear for if it had been placed nearer, and recei the Blood ſtill divided into its ſmalleſt P ticles by the Force of the Air in the Lun ſuch Particles might have enter'd the Glan and afterwards cohering to one another might have obſtructed ſuch extremely n row Channels. Now the Brain being pla at ſuch a Diſtance, the Particles, that their attractive Power form Corpuſcles, w have ſufficient Time to coaleſce, and th Magnitudes will hinder their entring i the Glands; for if it ſhould happen th theſe Particles ſhould enter the Glands, a there unite together, they would then ſtruct the Paſſage to the Nerves, and pr duce *Apoplexies*, *Palſies*, *Coma's*, *&c.*

The Particles of which the Animal Spir conſiſt being of ſuch extreme Fineneſs, th Quantity can bear but a ſmall Proportion the other Fluids in the Blood; and con quently there was a Neceſſity of a pro gious Number of Glands to ſeparate th from the Blood, and this is the Reaſon the great Bulk of the Brain.

The Operations of Nature are always moſt eaſy and ſimple; from whence he fers, how much more eaſy it is to have ſeveral Secretions formed after the Man which has been demonſtrated, than to po poſe as many different Sorts of Particles the Blood as there are Fluids ſeparated fr it; for 'tis difficult to determine how ma different Sorts of Particles are in the Blo The Doctor thinks, that Phyſick is in thing ſo defective as in the Knowledge the Nature of the Blood; but that if ſame Pains had been beſtow'd upon it Mechanical Way, that have been vai ſpent in Search of its Principles by Ch miſts, we had long e'er now had a more p fect Knowledge of its Nature than ever can have by Chymiſtry; which can on ſhew how, by Art, its Parts may be alter not what Parts it contains.

He ſays, a few different Sorts of Partic variouſly combin'd will produce great V riety of Fluids: Some may have only o

t, ſome two, ſome three, or more, and
aps the aqueous Fluid is the common
s of all the Secretions.

Our Author thinks what he has hitherto
anced ſufficient to ſhew how Medicines
ate which increaſe or diminiſh the Quan-
of any Secretion. There is no Need of
ng Medicines Commiſſions for ſearching
opening the Sluices of particular Glands;
have they a general Power to attenuate
diſſolve all the Coheſions of the Blood;
hen we might ſtill ask, Why their Ope-
ons appear only on one Sort of Glands?
y does Jallap carry the diſſolv'd Hu-
rs through the Glands of the Inteſtines
er than any other? Why does Mercury
ate, or Nitre force Urine? All Theories
ecretions have laboured at this Point,
ch naturally diſcloſes it ſelf in this.

he ſeveral Humours being form'd by the
rent Coheſions of the Particles of the
d, the Quantity of Humour ſecern'd by
Gland, muſt be in a Proportion com-
nded of the Proportion that the Num-
of the Particles, cohering in ſuch a Man-
as is proper to conſtitute the Humour
ch paſſes through the Gland, bears to the
s of Blood, and of the Proportion of
Quantity of the Blood that arrives at the
nd: And hence it follows, that where
is a determined Quantity of a certain
nour to be ſeparated, the Number of
icles that are proper to compoſe the ſe-
d Liquor muſt be reciprocally propor-
l to the Quantity of the Blood that ar-
h at the Gland; and therefore if the
ntity of the Secretion is to be increas'd,
Number of the Particles is to be in-
d; if the Secretion is to be leſſen'd, the
ber of the Particles that are proper for
a Secretion is to be leſſen'd in the ſame
ortion. Medicines therefore which can
the Coheſions and Combinations of
articles, can either increaſe or diminiſh
Quantity of any Secretion. Thus for
ple, ſays the Doctor, ſuppoſe the Hu-
which paſſeth thro' the Glands of the
ines to be compoſed of three or four
l Sorts of Particles, that Medicine
will eaſily cohere to theſe Particles,
cohering increaſe their mutual Attra-
, ſo as they unite in greater Numbers
before they arrive at the Inteſtines, than
they would have done if the Medicine had not been given, muſt neceſſarily increaſe the Quantity of Humour which paſſeth through the Glands of the Inteſtines, if the Quantity of Blood which arrives at the Glands is not diminiſh'd in the ſame Proportion as the Number of the Particles is increas'd. Thus Diureticks, Sudorificks, and Medicines which promote all other Secretions, operate after the ſame Manner.

If Medicines which increaſe the Quantity of any Secretion, operate by uniting to and augmenting the attractive Force of the Particles which compoſe the Humours to be ſecern'd, May not the Particles of ſome Humours ſooner, more eaſily and ſtrongly, unite to the Particles of ſome Sort of Medicines than to another Sort? And conſequently may not different Humours require different purgative Medicines to carry them off thro' the Glands of the Inteſtines? And does not this re-eſtabliſh the Doctrine of Specifick Purges, confirmed to the Ancients by Experience and Obſervation, but rejected by the Moderns thro' a falſe Philoſophy?

After this, the Doctor ſhews how neceſſary the Knowledge of Secretion is for underſtanding the Nature of Diſeaſes. The Animal Body, ſays he, is nothing but a Machine, whoſe Actions and Motions are all performed by Fluids ſecern'd from the Blood, and Secretion is the Spring of all the Animal Functions. By its Means the Heart beats, the Blood circulates, the Limbs are moved, and the Aliments concocted and digeſted; and in a Word, the whole Animal Oeconomy and Life depend upon it, the Blood it ſelf ſeeming to have little other Uſe, beſides the recruiting and renewing the ſecern'd Liquors. I ſay therefore, ſince Life and Health depend upon the Secretions, ſo likewiſe muſt all Diſeaſes which are ſaid to be univerſally in the Blood, and many of thoſe which affect particular Parts. If the Quantity and Quality of all the Secretions are ſuch as are proper and uſeful for the ſeveral Purpoſes for which by Nature they are intended, How is it poſſible but that the whole Animal Oeconomy muſt be in right Order, and that Body in a good State of Health? Unleſs we could ſuppoſe an Error in the firſt Contrivance of the Body, a Thought which no Man in his Senſes could be guilty of.

But

But if the Quantity of any Secretion exceeds its due Bounds, what Diſorders it makes is evident from a *Diarrhœa*, *Diabetes*, *Epiphora*, *Sweatings*, *&c.* If the Quantity of any Secretion falls ſhort of what it ought to be, the Effects are of no leſs pernicious Conſequence, as appears from a Suppreſſion of Urine in the Kidney, from the Jaundice, and a Stoppage of Perſpiration. And that the Quality of the Secretions alter'd do likewiſe create great Diſorders, is obvious from the Pains of the Colick, of a *Diarrhœa*, and *Dyſentery*, from the Sharpneſs of Urine, which ſometimes produces Ulcers in the Bladder and Kidneys; and even the Spittle is known to corrode the Mouth. The Doctor ſays, he choſe to give moſt Inſtances of ſuch Secretions as are properly Evacuations, becauſe their Effects are apparent to every one. But if the Alteration of thoſe (ſays he) is of ſuch ill Conſequences, What Effects muſt an undue Quantity, or the vitiated Quality, of theſe which are retain'd in the Body, and employ'd about the neceſſary Functions of Life, produce? The Diſorders they create are not ſo evidently the Effects of their ill State, though by a juſt Reaſoning we may ſometimes deduce them; and therefore a right Notion of Secretion muſt be of the greateſt Uſe and Importance for the underſtanding of moſt Diſeaſes.

The Doctor inſtances in a *Diabetes*, whoſe preceding Symptoms (he ſays) are little wandring Pains, and frequent Twitchings of the Tendons, follow'd by a profuſe Evacuation of a clammy ſweetiſh Urine, which is conſtantly attended with a Thirſt, quick Pulſe, Faintneſs, and Loſs of Strength; all which increaſe and diminiſh in Proportion to the Flux of Urine. He ſhews, that the evident Cauſe of this Diſtemper is an habitual Drinking of ſtrong Liquors, which the more ſpirituous they are, the ſooner and the more violently they bring it; yet ſometimes it proceeds from a latent internal Cauſe: But the Nature of it is always beſt known, by conſidering the Effects which the evident Cauſes produce in the Body.

By an habitual Drinking of ſtrong Liquors, it comes to paſs that the *Serum* of the Blood contains a large Proportion of a ſpirituous Fluid. Now the Salts of the Urine or Blood (ſays the Doctor) will not diſſolve in ſo vinous a Spirit, *i. e.* the P cles of which the Salts conſiſt are ſtrongly attracted by one another than ſuch a Fluid; and therefore the Quantity Salts in the Blood will be daily incre and circulating through the Capillary V ſels, muſt irritate the fine Fibres, and c little Pains and Twitchings all over the dy. But when the *Serum* is full of t Salts, the Diſtance between them and Globules of the Blood will be leſs, and ſequently they will attract thoſe Glob more ſtrongly than the Globules attract another, and the Globules will be diſſo through the *Serum*, as is experienc'd by ting urinous Salts and Spirits in the red of the Blood when drawn in a Cup. W 'tis thus diſſolv'd and united to the Se 'tis carried off with the *Serum* through Glands of the Kidneys, and being unite the Salts, will alter their Figures and perties, and give them a ſweet Taſte.

Where he treats about the Quantity Blood in a Humane Body, he ſhews, all quick Evacuations of the Veſſels diminiſh the Quantity of Fluid ſeparate the Glands; ſo that the greater Quantity Urine is voided in a ſmall Time, the *Saliva* and Animal Spirits will be ſecr by their reſpective Glands, and conſequ Thirſt, Faintneſs, and Loſs of Strength, increaſe in Proportion to the Quantity Urine excreted.

From hence he thinks it is evident, the Indications of Cure are to diſſolve Coheſions of the Salts with the Blood, to carry them off by Urine; for which he recommends the Drinking of large Qu tities of Waters, and thoſe eſpecially wi have a Tincture of Lime, becauſe that ſtro ly attracts urinous Salts.

He ſays, this Theory furniſhes us wi plain Account of the Thickneſs of the Bl in Rheumatiſms; becauſe this Diſeaſe ſing generally from a Cold, the Orifices all the Cuticular Glands are extremely c tracted, ſo that ſcarce any Fluid but aqueous can paſs them; and therefore other Particles, by the Diminution of aqueous Fluid being brought nearer to another, will attract and cohere more ſtro ly, eſpecially in the Extremities, where Motion of all the Particles is near equa

11th Propoſition. The Doctor thinks ſufficiently proves the Neceſſity of diing the Blood in the Cure of Rheumams, and that this equal Celerity of the ood in the Extremities is alſo the Reaſon y the Concretions of the Gout are form'd re, unleſs by frequent Debauches, or a cay of Nature, the Motion of the Blood comes ſo languid, that theſe Particles eaſily ract one another in the Blood-Veſſels of Bowels; whereas the Motion of the ood is very ſlow, and then ſuch Remeas as warm and increaſe the inteſtine Mon of the Blood, and thereby diſturb the traction of the Gouty Particles, relieve Bowels, and ſend the peccant Matter to Extremities. To this Attraction of the rticles in the Urine, the Doctor aſcribes Formation of Gravel and Stone in the dneys and Bladder; and ſays, that the *ucleus* of the Stone in the Bladder being moſt equally ſurrounded every where with Fluid of Urine, its Attractions are alſt every where equal, and therefore the one conſiſts of ſo many parallel Shells. om hence the Doctor thinks it evident to Demonſtration, that liberal Drinking muſt event the Growth of both; becauſe the tractive Particles are thereby removed at o great a Diſtance to attract one another, ovided the Drink be not too full of Parles that eaſily and ſtrongly attract one other.

This Author doubts not but the Operaons of all Sorts of Medicines may be exained by this Principle of Attraction. For ample, ſays he, Medicines which thicken Blood are ſuch as conſiſt of very ſmall rticles, and are endow'd with a ſtrong atctive Force, by which eaſily cohering to Globules of the Blood, they increaſe eir Attraction to one another, and ſo agulate, or at leaſt condenſe, the Blood. t if a Medicine conſiſt of ſuch Corpuſes as will eaſily unite with the aqueous rticles, and increaſe their Attraction, ſo at they attract the Globules of the Blood ith a greater Force than the Globules atct one another, then will the Globules cede from one another, be diffuſed through *Serum*, and the *Coagulum* be diſſolv'd. he Doctor is perſwaded that a *Gonorrhea* produced by a very active Salt, which being ſtrongly attracted by the Humour in the Glands, and uniting to it, forms a very *virulent Pus*, which corrodes the Veſſels, and produces Ulcers; but Mercury mix'd with the Blood attracts the acid Salts of the Pox, and uniting to them, carries them off either by Stool, Spittle, *&c.* This Power by which Mercury attracts acid and ſharp Salts, is the Reaſon why Cinnabar is ſo good a Medicine in fix'd and vagrant Pains, as in a Rheumatiſm; for the Urine of Rheumatick Perſons is found upon Examination not to contain its due Quantity of Salts, which therefore being retained in the Blood, turn acid, and produce Pains.

The Doctor proceeds next to give an Account of the Manner how the Fluids, after they are form'd in the Blood, are ſeparated from it by the Glands.

This (ſays he) depends entirely upon the Figure and Structure of the Glands, which muſt be firſt determined, and then there will be no Occaſion to refute the Doctrine of Ferments, nor the *Hypotheſis* of Tubes differing as to the Figures of their Orifices, both which have been ſeveral times demonſtrated to be falſe.

Malpighius, *Bellini* and *Nuck*, the greateſt Anatomiſts of this Age, have diſcover'd that the Glands are nothing but Convolutions of ſmall Arteries; and the Nature of Fluids, whoſe Preſſure is always perpendicular to the Sides of the Veſſel, and equal at equal Heights of the Fluid, ſhews, that all the Veſſels of the Body in which the Liquors are continually moving, can have no other than a Cylindrical or Conical Form. If therefore the Sides of the Veſſels are ſoft, and equally yielding every where, they muſt, by the Preſſure of the Fluid contained in them, be equally every where diſtended; and conſequently the Section of ſuch a Veſſel perpendicular to its Axis muſt be a Circle; and therefore the Veſſel muſt be either a concave Cone or Cylinder, or leaſt ſuch a Figure whoſe tranſverſe Section is a Circle.

Therefore the circular Orifices of the Glands can only differ in Magnitude, and all Sorts of Particles of a leſſer Diameter than that of the Orifice of the Gland may enter it; ſo that without ſome further Contrivance, that Fluid which contains the biggeſt Particles muſt likewiſe conſiſt of all

the Particles of all the other Secretions: Neither could any Fluid thicker than the Blood be ſeparated from it, becauſe of the great Proportion of the aqueous Fluid, whoſe Particles being vaſtly ſmaller than any other, and inviſible to the beſt Microſcopes, muſt enter all the Glands, and be mix'd with the ſecern'd Fluid.

The Doctor concludes this Head with a Demonſtration how this Inconveniency may be prevented, and how the Particles of any Size may either be ſeparated by themſelves, or with any aſſigned Proportion of the aqueous Fluid, or of other leſſer Particles. But we refer the Curious for this to his Book.

Next he gives an Account of the Quantity of Blood in the Humane Body.

Phyſicians and Anatomiſts have generally determined the Quantity of Blood in the Humane Body to be between 15 and 25 Pound Weight; but upon what Grounds the Doctor ſays he knows not, and that all he can find, is the large Quantities of Blood voided by Perſons dying of violent Hæmorrhagies, from whence ſome have aſcribed a greater, and others a ſmaller, Quantity of Blood to the Body. Dr. *Moulin* has allotted a ſmaller Quantity than any, and determined it thus. He ſays, that in a Sheep which alive weigh'd 118 Pound, he found by bleeding it to Death there was only 5 Pound 1 qr. of Blood, which is leſs than a two and twentieth Part of the Sheep's Weight; and that in a Lamb weighing 30 Pound and a half when living, there was but one Pound and a half of Blood, or about a twentieth Part. Now if we ſuppoſe that a Man's Blood bears the ſame Proportion to his Weight as there was betwixt the Blood and Weight of the Lamb, the Doctor ſays, it will follow that the Quantity of Circular Blood in a Man weighing 160 Pound, will not exceed 8 Pound. But he obſerves that both theſe Eſtimations are made from the Quantity of Blood voided at an open Veſſel, and founded upon a Suppoſition that almoſt all the Blood in the Body runs out at the Wound, which he proves to be falſe thus: Suppoſe the right external Iliack Artery cut aſunder, ſo as that the Blood may freely flow out of the Wound, how can the Blood in the right Leg below the Wound be emptied? 'Tis cut off from the reſt of the Blood above, which ſhould drive it forwards, and it can have but little Aſſiſtance from collateral Branches, becauſe they themſelves can receive but a very ſmall Quantity of Blood, which runs all to the Wound, where it finds the leaſt Reſiſtance. The Arteries in the Leg can beat no longer, becauſe the Pulſe depends upon the Quantity of Blood thrown into them every *Syſtole* of the Heart, which in this Caſe is nothing, and theſe being the only regular Cauſes of the Motion of the Blood, it muſt ſtagnate in the Crural Veſſels. Perhaps the great Arteries will once contract, and have ſome ſmall Vibrations afterwards, by which they will thruſt the Blood into the Capillary Veſſels, and their convulſive Motions will ſqueeze the Blood forwards in the Veins; but when an Animal falls into Convulſions by Bleeding, it can bleed but little aftewards when the Motion of the Heart ceaſes. Beſides, neither all Animals, nor all Parts of an Animal, are convuls'd upon bleeding to Death: And though the great Arteries may contract, yet this Contraction muſt be very languid in the ſmall Arteries, which being innumerable, the greateſt Part of the Blood will be lodg'd in them, as well as in the Fibres of the Muſcles, which, though naturally white, appear then of a red Colour. Again, though the right and left Iliack Arteries do in the natural State receive an equal Quantity of Blood, yet when a Wound is made in the right, through which the Blood has an eaſy Paſſage, this muſt receive by far the greateſt Part of the Blood which comes down the *Aorta*; and conſequently the Circulation of the Blood muſt be very ſlow in the left Leg, and no more can run from it, than what is thruſt out meerly by the Motion of the Body, or what flows naturally in the ſtrait and large Veſſels, as Fluids will do to come to an *Æquilibrium*. For the ſame Reaſon the Aſcending Trunk or Branches of the *Aorta* can receive but a ſmall Quantity of Blood, and therefore the Pulſe in the Arteries of the Brain muſt be very languid, or none at all; upon which Account the Motion of the Spirits muſt ceaſe, and conſequently that of the Heart. When the *Aorta* begins to be empty, the Blood having little or no Reſiſtance, flows eaſily into the empty

Veſſels

eſſel, and a very ſmall Quantity of it will ter the Orifices of the Coronary Arteries the Heart, the Valves covering them, and nſequently the Motion of the Heart muſt aſe for Want of Blood.

'Tis for the two laſt Reaſons (ſays the octor) that the larger the Veſſels are that wounded, the ſooner the Animal dies; d if the *Aorta* it ſelf was cut aſunder, ere would be a ſmaller Effuſion of Blood m it than from a ſmaller Artery: For ce the Blood in the *Aorta* thruſts forward t in the Veins, and makes it paſs from *Vena Cava* into the right Auricle of the art; 'tis plain, that when the Blood in *Aorta* is intercepted, 'twill be no longer ven through the Veins, but ſtagnate in m, no more of it coming to the Heart n what flows into it from the Fulneſs of Veins; and conſequently ſince the Heart ows but a ſmall Quantity of it into the *rta*, the Circulation will be quickly ſtop- both in the Aſcending and Deſcending nks, and there will be no greater Effu- n of Blood than what can be contained the great Artery, which holds but little. herefoever the Wound is, the Animal will ſo long as the great Artery keeps full; whenever that begins to empty, the od in all its Branches muſt ſtop, and con- ently the Animal muſt die.

The Veſſels of the Animal Body may be dually dilated or contracted, and as they not ſuffer any violent and ſudden Stretch- without breaking, ſo neither can they ediately contract upon any ſudden Eva- tion; and therefore when any great Ar- is wounded, the Animal dies after a Pulſations of the Heart, the ſaid Artery g immediately emptied: But when a ll Artery at a great Diſtance from the rt continues bleeding ſlowly, all the ſels throughout the whole Body gradual- contract; ſo that after many Pounds are uated, they may be as full as they were rſt, and conſequently the Animal not ſo h as faint, the Veſſels in the Brain be- ſtill kept full, and the Spirits driven ards in the Nerves; nor can the Animal till ſuch Time as the Veſſels contract here. For this Reaſon, ſays the Doctor, have no Obſervations which give Ac- t of ſuch large Effuſions of Blood at Wounds of the great Arteries, as we have from the ſmall Veſſels of the Noſe, and from the *Hæmorrhoides*; and therefore Dr. *Moulin*'s Determination of the Quantity of the whole Maſs of Blood, which is calculated from the Quantity voided at the Carotide and Jugular Veſſels, is much leſs than what others from the Obſervation of Hæmorrhagies of ſmall Veſſels have determined it to be.

He obſerves, that this contractive Power of the Veſſels is not equal in all Bodies; for in ſome 'tis greatly diminiſhed by the Viſcidity of the Blood, and the Obſtruction in the Fibres and Capillary Veſſels; and therefore ſome Men may die of a much leſs Effuſion of Blood than others, who perhaps may have a leſs Quantity of Blood. For the ſame Reaſon ſome Perſons faint upon opening a Vein of the Arm. If this elaſtick Power of the Veſſels is ſtrong and great, then as the Blood is let out, the Arteries of the *Pia Mater* contract, and are kept full as well as the Coronary Veſſels of the Heart, and conſequently there is neither Blood nor Spirits wanting for performing the Motion of the Heart: But 'tis otherwiſe where this elaſtick Tone of the Veſſels is wanting, *viz.* to ſuch as have a ſoft and looſe Fleſh, a lax and cachectick Habit of Body; and therefore when they require Bleeding, 'tis convenient to ſtop the Blood at ſmall Intervals, to give the Veſſels Time to contract before the full Quantity deſign'd be drawn off, and if they are ready to faint, the throwing cold Water in the Face, to cauſe a ſudden Contraction, and the putting them in an Horizontal Poſture, that the Veſſels of the Brain may fill, and the Blood have an eaſier Reflux from all the Parts, prevents the Fit. Thus for Want of the ſame Energy of the Veſſels, ſome faint upon any ſudden Evacuation by Urine, Stool, or otherwiſe. This appears further, becauſe ſuch as faint upon Bleeding at the Arm, do not faint upon Cupping, though the ſame or more Blood be drawn off that Way, and from the Fainting of Perſons tapped for an *Aſcites*, if too much Water is drawn off at once. Yet it can't be ſuppos'd that the Spirits which are in the extravaſated *Lympha* have any immediate Influence upon the Nerves and Heart, or that their Subſtraction ſhould preſently

drain the Nerves of Spirits, or that the Spirits are so quickly spent as to suffer because of the Want of a Supply from an extravasated Fluid; but in an *Ascites*, the Descending Trunk of the *Aorta*, and all its Branches, being considerably compress'd, the Blood must necessarily dilate the Ascending Branches beyond their natural Bigness; but when the Waters are let out to any considerable Quantity at once, the Blood has a freer Passage into the Descending Trunk, the Sum of the Cavities of both Arteries is augmented, and the Quantity of the Blood thrown out every *Systole* not being greater, the Arteries cannot be so much dilated, and consequently the Pulse becomes small, the Spirits are but slowly propell'd through the Nerves, the Blood flows but in a small Quantity into the Coronary Vessels of the Heart, and a *Syncope* must ensue, till the Vessels can recover their Tone, and the Blood in all the Arteries comes to an *Æquilibrium*; for which Reason the Doctor recommends the Use of some Cordial, to rarify the Blood, and rouse the languid Motion of the Spirits.

The Doctor proves, that the Quantity which the Compression of the Descending Artery must throw into the Ascending Branches is considerable, and affects the whole Machine, from the Flushing and Head-ach which some feel after a plentiful Meal, when the Stomach and Guts being loaded, press upon the Descending Trunk, and contract its Cavity, which are the Causes why a greater Quantity of Blood passes into the Ascending Trunks; but if the Cavity of the Descending Trunk should be dilated, there will be a less Quantity of Blood thrown into the Ascending Trunk, and consequently the Effects on the Animal Body must be at least as sensible.

This contractive Power of the Vessels ought to be duly consider'd before the least Quantity of Blood be drawn in most acute, as well as chronick, Diseases; for otherwise it may be lost to a great Degree in a few Hours. He condemns the drawing off a large Quantity at a Time, and says, it may be done more safely, and to as good Purpose, at small Intervals. 'Tis evident from the Theory of Secretions, that both the Quantity and Quality of the Secretions may be alter'd by Blood-letting; so that when the Blood is upon a Ferment, and generates new Co sions of whose Nature we are ignorant, a Risque which ought not to be run with evident and cogent Reasons.

The Doctor proves, that the Quantity Blood in the Humane Body must be mu greater than the common Estimation of Ph sicians, and next endeavours to shew ho much it is.

By Blood, he understands both the Flu in the Veins and Arteries, and that in Lymphæducts, Nerves, or any other Ve in the Body, they being all Parts of Blood separated from it by the Force of Heart, and many of them by the same Fo return to it again.

He supposes the whole Body to be thing but Tubes, or Vessels full of Blo or Liquors separated from it, as is agreed all who understand the Fabrick of the Bo He quotes *Leeuwenhoeck*, who says there seem to be above 10000 Blood-Vessels in the Sp of 1 qr. of an Inch square, so that one c not prick a Finger with the finest Needle it wounds a Blood-Vessel. The Fibres the Muscles (which make by far the grea Part of the Body) are full of Blood, the Fibres of the Bones have their Fluid.

After this, the Doctor shews the Prop tion of the Fluids to the Vessels by a gure, for which we refer the Curious to Book.

He observes, that if the whole Body compos'd of Veins or Arteries, it were to determine the Quantity of Blood: since the Coats of the Arteries have a gre Proportion to their Cavities than the Ve have to theirs, and these again a greater P portion to their Cavities than the Lymp tick Vessels to theirs; and since there be one Proportion of the Nerves, anothe the Fibres of the Muscles, and another those of the Bones, the Doctor says, that ought to be known before the Quantity Blood can be exactly determined.

To this End he lays down Methods finding the Thickness of the Coats of Blood-Vessels, the Proportion of the Bl in the Arteries to the Coats of the Arte the Proportion of the Blood in the Veins the Coats of the Veins, and how the B of the Blood increases upon a small Incre of the Diameter of the Blood-Vessel;

n thoſe Proportions he ſays a more exact
gment may be form'd to what Degree
Blood is heated or rarified in Inflamma-
Fevers by the Largeneſs of the Pulſe,
lſo how ſmall a Quantity of Blood muſt
hrown out at the Heart every *Syſtole* in
guid Fevers when the Pulſe is ſmall.
n he ſhews how prodigiouſly Aneuriſms
dilate the Arteries, and how, when a
e Trunk of an Artery in the Arm, Leg
high, is tied, the ſmall Arteries (which
communicate with one another) may
te to carry on the Circulation of the
od.

he Doctor ſays, the Fibres of the Muſ-
, tho' they may be more bulky, cannot
more numerous than the Arteries, ſince
y Fibre muſt have at leaſt an Artery,
'tis probable it has ſeveral. He puts it
ond Doubt that they have conſiderable
vities, ſince they ſwell, are blown up,
thereby much ſhorten'd when the Muſ-
act; and their Sides can be but thin, or
they could not be diſtended by ſo ſmall
orce, nor would the Blood appear as
inly through them as it does through an
ery of equal Bigneſs. To make ſome
mate of the Proportion of the Thickneſs
their Sides to their Cavities, he made the
lowing Experiment:

He took a Piece of the Inteſtine of a Dog,
h Part of the Meſentery and *Pancreas*
lli, and having carefully empty'd it, and
igh'd it with all the Blood in the Veſſels,
was an Ounce and a half, one Dram, and
hteen Grains. Then he waſh'd out all the
od in the Artery with warm Water, blew
p, hung it to dry in the Shade, and in a
ek's Time weigh'd it again, when 'twas
iniſh'd 637 Grains. But he ſays this
s could be only of the Fluids, which be-
diluted with the warm Water, were the
re eaſily evaporated; therefore if the
od in every Part of the Body bore the
e Proportion to the ſolid Part that it
s to the ſolid Part of the Inteſtines, their
portion would be 3.9 to 1, and a Body
ighing 160 Pound, would contain 127
und of Blood; ſo that even the Fibres of
Muſcles are leſs ſolid than the Arteries:
the Fibres which perform the periſtal-
Motion of the Inteſtines, are firmer
harder than the Fibres of the Muſcles.
Beſides, the periſtaltick Motion is perform'd by a very ſmall Contraction of the Fibres, for which a very ſmall Inflation will ſuffice; but the Contraction of the Fibres of the Muſcles being great, they muſt be conſiderably inflated, and conſequently more ſpongy, and capable of receiving more Blood than the Fibres of the Inteſtines; wherefore 'tis evident, that in the Muſcles the Proportion of the Blood to the ſolid Fibres muſt be above 3.9 to 1, or almoſt as 4 to 1.

To know what Proportion the Fluids of the Nerves bear to the ſolid Part of the Nerves, the Doctor dried a Piece of the *Medulla Spinalis* without any Art or Preparation, except the ſlitting of it, and he found that it loſt near 3 4ths of its Weight; from whence he infers, that the Nerves are not more ſolid than the other Parts. And as to the Lymphatick Veſſels, he believes all will agree, that the Fluids in them bear a much greater Proportion to their Coats than what has been yet found.

He ſays, that the Bones have alſo their Fibres and circulating Juices: What elſe is the *Callus* which cements the Extremities of broken Bones? In it there are no Fibres nor Parts to be diſtinguiſh'd, but it appears like an uniform inſpiſſated Juice; and the Doctor thinks it always circulates, though ſlowly, becauſe whenever a Bone is broke, 'tis always at Hand. If it ſtagnated, it would harden, as it does when it is extravaſated, and forms a *Callus*, and conſequently all the Paſſages being obſtructed, no broken Bone could unite. He ſays, this Juice is like the viſcous Sap of Trees, and moves as eaſily through the Fibres of the Bones, as that does through the Fibres of an Oak, which he thinks evident from the Excreſcencies of the very Subſtance of the Bones, their Nodes, Swelling, and Softening like Wax, of which ſeveral Inſtances are to be found in Authors even of Perſons grown in Years. He grants, that the older we grow, the narrower are the Channels of the Fibres, the viſcid Fluid hardening towards their Sides, and after Death entirely obſtructing them, ſo that the whole Fibre appears ſolid; but ſtill 'tis really no more a Part of the Fibre, than the Cruſt with which ſome Waters line the Pipes through which they run is Part of the Pipe. Beſides, it may be taken out with-

without bringing away any of the Subſtance of the Bones in which 'tis contain'd. He inſtances in Hartshorn, whoſe Fibres and Subſtance remain undiſſolv'd after the Fluid or Jelly is extracted. To know what Proportion it bears to the Fibres of the Bones, the Doctor caus'd the Bone in the Knuckle of Beef, after boil'd, and the Marrow taken out, to be put into the Digeſter, when it weigh'd 22 Ounces 6 Drams and a half; but when 'twas taken out and dried, it loſt above half its Weight, and yet the Texture of the ſmalleſt Fibre in the moſt ſpongy Part of the Bone was not broken, and the Middle or more ſolid Part appear'd to be made of parallel *Laminæ*, of which four or five were ſcarce thicker than a Sheet of Paper; and he thinks, that if the Experiment had been made upon younger Bones, the Proportion of the Fluids to the ſolid Part would have been much greater. He alſo allows Fluid to the Tendons, Membranes, Ligaments and Cartilages, becauſe they are much ſofter, and likewiſe yield a Jelly upon boiling; and thinks, there is not a Fibre in the whole Body in which ſome Fluid or other does not circulate, though hardening after Death, it cannot be extracted by any Elixation. In a Word, he concludes, that whoſoever is acquainted with the Preparations of the Curious Dr. *Ruyſch*, would think the whole Body and all its Fibres were nothing but Blood-Veſſels.

He determined the Quantity of Fluids in the Coats of the Arteries to be to the Coats as 1.7. to 1, by a Piece of the *Aorta* of a Calf, which weigh'd 240 Grains, and when dried but 80, and yet he does not ſuppoſe that any more than the thin Part of the Blood was exhaled.

After this, the Doctor lays down a general Method for determining the Quantity of Fluids in the Coats of the Veſſels, to which we refer.

If the Body is compos'd of Veſſels whoſe Coats are made of other Veſſels, and theſe again of others, as has been ſaid, the Doctor infers, that the Bodies of the *Animalcula in Semine*, or the *Prima Stamina Vitæ*, may be increas'd to any Bulk, and the Coats of the Veſſels, as far as we can diſcern, grow thicker and thicker without the Addition of any Subſtance to the Veſſels, only by increaſing the Quantity of Fluid with which they fill'd: For as the large Veſſels ſwell, ſo wiſe muſt the ſmall ones, of which Coats are compos'd down to the very and the Swelling of the ſeveral Orders Veſſels muſt neceſſarily increaſe the Thi neſs of the Coat of that Veſſel which compoſe; ſo that by increaſing the Num of the Orders of the Veſſels, the Coats the firſt Order of Veſſels may be increas any Degree, and yet the Diameter of Veſſels which compoſe theſe Coats not gre than a given Line.

That the Coats of the great Veſſels compos'd of ſmaller Veſſels is Matter Fact, ſays the Doctor, and for ought know the latter may be compos'd of o Veſſels ſtill ſmaller than themſelves. Mr. *per* ſays, every Membrane is veſicular, may be blown into innumerable Cells. *Cornea* of the Eye conſiſts of as many pa lel *Laminæ* as the niceſt Hand of the expert Anatomiſt can raiſe.

The thin Membrane which involves Brain divides it ſelf into two *Laminæ*; the Doctor thinks, that the *Hydatides*, which ſeveral are found one within anot are nothing but the Coats of the Lymp tick Veſſels diſtended and ſeparated by *Lympha*, though the Coat of a Lymphat is ſo thin, that 'tis not viſible but w diſtended with *Lympha*. *Leeuwenhoeck* ſa that the Fibre of a Muſcle, which wa times ſmaller than a Hair of his Beard, w made up of 100 ſmaller Fibres, and yet e of theſe muſt have had Nerves, Veins Arteries, and perhaps each of them made of 100 more; but this cannot be diſcove by a Microſcope, becauſe only one O can lie at a Time in the Forms of the Gl and if more could, their ſeveral Refracti would confound the Sight.

If all the ſolid Part of the Body contain'd in the *Animalcula*, then (ſays Doctor) Accretion and Nutrition are thing but the Repletion and Diſtention the Veſſels. He ſays, this Doctrine is rat confirmed than contradicted by Dr. *Ward*'s Experiments concerning Vegetatio for the fewer terreſtrial Particles are co tain'd in the Water by which any Plan nouriſh'd, the quicker the Water paſſes through the Pores or excretory Ducts of

Pla

and conſequently the Veſſels are the iſtended; but if the Water is impreg- with a large Quantity of terreſtrial r, it cannot paſs off quickly, but be- tain'd in the Plant, the Veſſels muſt ſtended, and conſequently the Bulk of ant increas'd. He obſerves, that Plants t thrive without proper Nouriſhment ore than Animals; for Life is con- , and all its Functions performed, by raining off of ſeveral Sorts of Juices he common Fluid, which in Animals led Blood: But if that Fluid cannot theſe Juices, or is not fit to be turn'd hem, then that Body, whether vegeta- animal, muſt turn ſickly and die. ds, that ſome Sorts of Water are more tranſmuted into the Juices of ſome than others, ſince ſome love a dry, me a wet Soil, and ſome will grow in alone.

the Doctor obſerves, that if the moſt Food can only diſtend, and not in- the Subſtance of the ſolid Part of the 'tis much more reaſonable to ſuppoſe, o Matter, howſoever diſpoſed, can theſe ſolid Parts without the imme- ctuation of an Omnipotent Power.

thinks what has been hitherto ad- , demonſtrates the great Probability t Suppoſition which the Reverend *ark* uſes to ſhow the Poſſibility of the ection of the ſame Body; becauſe if ſolid Parts are no more than the ori- *tamina*, and all Nouriſhment only a in a perpetual Flux, then no Part of mal Body can become Part of ano- ut the Body is always the ſame from Moment of Life to the laſt.

whether the Coats of the Veſſels are 'd of others or not, the Doctor thinks eriments clearly demonſtrate, that the in the Body are to the Solids at leaſt o 1, ſo that in a Body weighing 160 there muſt be 127 Pound of Blood. put the Matter out of Diſpute, he the Weight both of the Fat and though he ſuppoſes the former circu- he has already ſhewn there is a Fluid atter.

ppoſes, that in a Body weighing 160 the Fat is an Inch deep all round. *newright* reckons the Surface of the Body 15 ſquare Feet, ſo that the Fat muſt be 180 cubick Inches, each weighing about half an Ounce; according to which Calculation, the whole Fat of a Man's Body weighing 160 Pound, is 5 Pound 10 Ounces; but our Author ſuppoſes it to be 7, and the Bones 20 Pound, and there remains 100 Pound for the Quantity of Blood in a Man weighing 160 Pound.

The Doctor proceeds next to give an Account of the Velocity of the Blood, which he determines thus.

The Velocity with which a Fluid flows out of any Orifice uniformly, and always running in the ſame Quantity, is equal to the Velocity of a Body which deſcribes a Space of the ſame Length with that of a Cylinder, whoſe Baſis is equal to the Orifice, and whoſe Magnitude is equal to the Quantity of the Fluid that runs out at the ſame Time. Now he ſuppoſes the Heart contracts 80 times in a Minute, and that each Contraction throws an Ounce of Blood into the *Aorta*. An Ounce of Blood is equal in Bulk to 1,659 Inch, and conſequently 80 Ounces are 132,72 Inches. He ſays, the Diameter of the *Aorta* in a middle-ſized Man is 0,73 Parts of an Inch, and its Orifice 0,4187. by which divide 132,72. the Quotient will be 316 Inches, or 26 Feet, the Length of the Cylinder or Space through which the Blood will go in a Minute, ſuppoſing it were conſtantly going out of the Heart with the ſame Velocity. But becauſe of the *Diaſtole* of the Heart, which is at leaſt half the time of a Pulſation, there go out 80 Ounces in half a Minute, and conſequently the Velocity of the Blood is at leaſt twice as great, or ſuch as will make it to move at the Rate of 52 Feet in a Minute, the Doctor has therefore ſuppos'd that the Heart throws out but an Ounce of Blood every *Syſtole*, becauſe that being allow'd of by all, gives the leaſt Velocity; whereas if every *Syſtole* throws out two Ounces, as many do ſuppoſe, then the Velocity is double to what it has been here determined.

If the Sum of the Sections of the Branches of the Arteries were always equal to the Section of their Trunks, and if the Circuits in which the Blood moves were every where equal, the Velocity of the Blood would be every where the ſame it has been de-

min'd to be in the *Aorta*. But 'tis certain that the Sum of the Sections of the Branches does every where exceed the Section of their Trunks, ſo that the Velocity of the Blood muſt decreaſe as the Number of Branches increaſes. He endeavours to find out this Truth by particular Computations, and Geometrical Proportions, to which we refer; and after all reſts aſſured, that the laſt *Ratio* of the Branches to their Trunks falls much ſhort of what he has found in ſeveral Places of the Body; and he is inclined to think, that the *Ratio* increaſes every Diviſion from the great Arteries. But till this exact *Ratio* is diſcover'd by ſome nice and exact Meaſures of the Veſſels taken after the Manner he propoſes, he calculates the leaſt Velocity, at the hundredth Diviſion only, to be 1000000000 times leſs than it is in the *Aorta*; which if ſo, the Blood in the laſt Diviſion of the Artery moves one Foot, that in the *Aorta* 1000000000 at the Rate of 52 Feet in a Minute, or 100000000 in 13354 Days, in which Time the Blood at the hundredth Diviſion moves only one Foot, or it would be 278 Days in moving a Quarter of an Inch, if the laſt Branches were ſo long. But if the leaſt Velocity is at the 70th Diviſion, the Blood will move there at the Rate of a Foot in about 13 Days, and at the 50th at the Rate of a Foot in 3 Hours.

He obſerves, that as we are to conceive all the intermediate Degrees between the greateſt and the leaſt Velocity, ſo we are not to imagine that there is the leaſt Velocity in every Evaneſcent Artery, but only in ſuch as have 100 Diviſions between them and the Great Artery, and the Velocity of the Blood in the Evaneſcent Artery is every where proportionable to the Number of Diviſions between them and the Great Artery; and therefore in all the ſmall Arteries which come immediately from the *Aorta*, and after a few Diviſions tranſmit their Fluid to the Veins, the Velocity of the Blood is but a little diminiſh'd.

From hence the Doctor concludes, that when the whole Maſs of Blood is to be alter'd, the Courſe of Phyſick ought to be continued for a long Space of Time; becauſe the Blood moves ſlower and ſlower the farther it moves from a great Artery, and conſequently it muſt be a great while before the whole Maſs of Blood can be mi with the alterative Medicine. And ſince Circulation of the Blood through Gl which receive Arteries immediately fro great Veſſel is very quick, they may c off a great Proportion of the Medicine very little Time; and therefore the Do obſerves, 'tis not the taking of great Qu tities, but a conſtant taking, that can a the Maſs of Blood; and that when Blood is to be alter'd by Mineral Wa which are apt to paſs through the Glan the Kidneys, they ought not to be drunk large Quantities; for if they paſs off, t have not the deſign'd Effect, and if they not, being drunk in a little Time, they but with a ſmall Quantity of Blood, w muſt diſorder the Animal Oeconomy.

The next Thing the Doctor treats o Muſcular Motion.

He ſays, a Muſcle is a Bundle of Plates of fleſhy Threads or Fibres inc by one common Membrane. All the Fi of the ſame Plate are parallel to one ano and tied together at extremely little Di ces by ſhort and tranſverſe Fibres. fleſhy Fibres are compos'd of other ſm Fibres, incloſ'd likewiſe by a common M brane. Each leſſer Fibre conſiſts of ſmall Veſicles or Bladders, into whic ſuppoſes the Nerves, Veins and Arteries open; for every Muſcle receives Branch all thoſe Veſſels, which muſt be diſtrib to every Fibre. The two Ends of each M cle, or the Extremities of the Fibres, a the Limbs of Animals faſten'd to two B the one moveable, the other fix'd; therefore when the Muſcles contract, draw the moveable Bone according to Direction of the Fibres. When the M cles contract in Length, they ſwell in T neſs; but this Power of contracting or ling is loſt, when either the Artery or N of the Muſcle is cut or tied; and the he concludes, that the Contraction, S ling or Motion of the Muſcles is perfo by the Blood and Animal Spirits diſtend the Veſicles or Cavities of the Fibres. Diſtention of the Veſicles of the F muſt be either by their being fill'd w greater Quantity of Blood and Anima rits than they were before the Contra

the Blood and Spirits mixing muſt rarefy
d fill up a greater Space.
He ſays, it will appear that the Veſicles
the Fibres are not diſtended purely by the
ood and Spirits, by conſidering, that were
ſo, Nature (whoſe Operations are always
moſt ſimple) had only us'd one Fluid,
ce in the Works of Nature there are no
ere two neceſſary Cauſes where one could
ve ſerv'd the ſame End. Now let the
antity of the Fluid brought by the Nerves
the Muſcles be never ſo ſmall, that alone
ght have contracted the Fibres (if a Quan-
only of a Fluid had been requiſite) by
iniſhing the Diameters of the Cavities
Veſicles of the Fibres: And as it is evi-
nt, that the Reaſon why the Spirits alone
not diſtend the Veſicles is not for Want
a ſufficient Quantity, ſo if there had not
n a ſufficient Quantity of the nervous
uid, yet the Quantity of Blood could
ve given no Aſſiſtance in the Diſtention of
Veſicles; for if they contain more Blood
en the Muſcles contract than when they
relax'd, it muſt proceed from the Blood's
ng ſtop'd in the Vein, or it muſt move
denly with a greater Velocity through
Artery into the Cavities of the Fibres.
the latter, it muſt be by the Contraction
its Coats, or by ſome external Preſſure
on them: If by the Contraction of the
res which compoſe the Coats of the Vein,
ſame Difficulty remains, ſince whatever
the Cauſe of the Contraction of the
res in a Vein, it will likewiſe ſerve to
ntract the Fibres of a Muſcle. If the
od is ſtop'd in the Veins by a Preſſure
on their Coats, it muſt be by a Swelling
the Artery or muſcular Fibres. If the
tery ſwells and preſſes on the Vein, the
culation of the Blood muſt be entirely
p'd; for that Preſſure will conſtantly in-
aſe, the Blood being ſtill accumulated in
Artery, and therefore it will for ever
der all Paſſage through the Vein: But if
Blood moving ſometimes quicker thro'
Artery into the Veſicles of the Fibres
ends them, this greater Velocity muſt
ceed from the Force of the Heart, from
ich alone the Blood derives its Motion.
w if the Heart acts with a greater Force,
will increaſe the Velocity of the Blood
verſally throughout the whole Body,
and its each Muſcle and its Antagoniſt will be thereby equally contracted, and conſequently neither will contract: And therefore ſince both the Blood and Fluid of the Nerves are neceſſary to the Contraction of the Muſcles, and ſince the Contraction is not perform'd by the Quantity of theſe Fluids, it remains only that by their Mixture they rarefy and diſtend the Veſicles.

Now for the explaining of the Rarefaction of the Blood and Spirits in the Veſicles of the muſcular Fibres, the Doctor ſuppoſes a ſmall Globule of Air between the Particles of a Fluid, and that the Particles have a ſtrong attractive Force by which they endeavour to come together, and preſſing every way equally on the Globule of the Air, will hinder it from eſcaping any Way from between them; but the Force by which they endeavour to come together being prodigiouſly greater than the Force of their Gravity, they will by this Force produce a very conſiderable Condenſation of the Globule of Air that lies between them, and the Force of Elaſticity being always proportional to its Condenſation, the Force by which this airy Globule will endeavour to expand it ſelf will likewiſe be vaſtly great; and conſequently if this *Niſus* of the Particles of the Fluid to come together ſhould be taken off, the Air between them would expand it ſelf with a very conſiderable Force. Now (ſays the Doctor) if upon the mixing of another Fluid, the Particles of the firſt ſhould be more ſtrongly attracted to thoſe of the other, than they were before to one another, then would their *Niſus* to each other ceaſe, and they would give the Globule of Air between them Liberty to expand it ſelf, and the whole Fluid would take up a greater Space than before. But when the Particles of both Fluids come to be united, they will again incloſe the Globule of Air between them, and by their mutual Attraction ſoon bring it to its former State of Condenſation.

Now that the Blood contains a great Number of Globules of Air, is evident from the Quantity it yields in the Air-Pump; and that the Particles of the Blood have a ſtrong attractive Force, has been ſufficiently ſhewn already. By this Attraction of the Particles the Globules of the Blood are

form'd, and in viewing its Circulation by a Microſcope, the Doctor has obſerv'd, that where the Diameter of the Canal has been leſs than that of a Globule of Blood, the Globule would be preſs'd into a ſpheroidical Form; but when it came into a wider Part of the Canal, it would reaſſume its former Figure; which the Doctor attributes to a ſmaller Globule of Air inclos'd within, and expanding it ſelf equally every way, when the Sides of its circumambient Shell of Blood are not longer preſs'd by the Sides of the Canal.

Theſe Globules of Blood continually circulating through the Veſicles of the Fibres, (which probably can contain only one at a Time) meet with the Animal Spirits which drop from the Nerves. Now the Minuteneſs of the Glands of the Brain, and the Smallneſs of the Fibres of the Nerves, plainly ſhow, that the Animal Spirits are a Fluid conſiſting of the ſmalleſt Particles of any in the Body, and therefore their attractive Force muſt be the greateſt of all the Particles in the Blood; for which the Doctor refers to Sir *I. Newton*'s Calculation about the Rays of Light; and conſequently the Animal Spirits meeting with the Globules of the Blood in the Veſicles of the Fibres, and ſurrounding them, muſt attract the Particles of which they are compos'd more ſtrongly than they do another; and conſequently their *Niſus* to one another ceaſing, the condens'd Globule of Air will expand it ſelf with a very conſiderable Force, whereby each Veſicle of the Fibre will be diſtended, and ſo the Fibre ſhorten'd, *i. e.* the Muſcle contracted. But when the Particles of the Globule of Blood are mix'd with the nervous Fluid, they will both together incloſe the Globule of Air again, and compreſs it into as ſmall a Space as before, and thus the Contraction of the Muſcle muſt immediately ceaſe, unleſs freſh Blood and Spirits ſtill ſucceeding one another, continue the Inflation of the Veſicles. But when a Muſcle has been ſtrongly contracted for ſome Time, the Quantity of Spirits ſpent being more than can be received in the ſame Space of Time by the Glands which ſupply its Nerves, the Inflation of the Veſicles muſt fall, and the Muſcle grow weak; whereas the tonick Motion of the Muſcles being performed by the Spirits, protruded only by the Quantity leſs ſecern'd in the Glands, will conſtantly continue without any Wearineſs.

After this Manner he conceives the Veſicles to be diſtended without any Ebullition or Effervеſcence, and their Diſtention to ceaſe without any Precipitation or Flying off of the aerial Globules through the Pores of the Muſcles; and to this Attraction of the Particles of Matter he aſcribes moſt of the *Phænomena*, for explaining of which, Philoſophers have been forced to recur to active and ſubtile Principles, which (contrary to their own Principles) they have made to move and act as they pleaſe: But how they came by ſo great an Activity, is not to be accounted for from any of their Principles. Thus (ſays the Doctor) in explaining Muſcular Motion, they make the Animal Spirits to cut the Globules of Blood with their ſharp Points, that the impriſon'd elaſtick *Aura* might be ſet at Liberty, which could not be effected, without ſuppoſing that there may be Holes in a fluid Globule, and that the fluid Particles ſtand in a Heap; and when the aerial Globule is got looſe, the Intumeſcence of the Veſicle cannot be aſſwaged, but by ſuppoſing the elaſtick Globules now to have Strength to break through the Muſcles and Skin to come at the external Air, though before they had not Power enough to pierce through a thin Shell of Blood.

The Doctor comes next to ſhow the Mechaniſm of the Fibres. He ſays, each Fibre of a Muſcle conſiſts of a Multitude of ſmall Veſicles, like a String of Bladders; and therefore the Contraction of the Muſcle is always proportional to the Length of its Fibres; and ſince the greateſt Contraction of the Fibres is always leſs than one Third of their Length, 'twas neceſſary that the Inſertions of the Muſcles ſhould be near to the Joints, not only to increaſe the Velocity of the Parts moved, but that they might deſcribe greater Arches round the Centers of their Motion.

Hence it is (ſays the Doctor) that the Parts which deſcribe the greateſt Arches are moved by the longeſt Muſcles; as the Hand round the Elbow, which is bent by the *Biceps* ariſing from the *Scapula*, and the Foot round the Knee, by the Muſcles whoſe Originations

inations are as far diſtant as the *Iſchium*; hich Joints if they had been moved by ort Muſcles inſerted at each End into the xtremities of the articulated Bones, the rm and Leg had moved but a little Way, nd the Arches the Hand and Foot had deribed about theſe Joints, had been to the rches they deſcribe now, as the Length of e ſhort Muſcles had been to the Length the Muſcles they have now. On the ntrary, where the Joints have but a ſmall lotion, the Muſcles are ſhort: Thus the ngers are pull'd ſideways by the *Interoſſei*, e Thigh is drawn outwards and obliquely the *Quadrigemini* and *Obturatores*, which e all ſhort Muſcles, and moſt of thoſe of e *Vertebræ* run between one *Vertebra* and e next.

The Veſicles of which the Fibres conſiſt e extremely ſmall; for though one large adder may raiſe a Weight as high as ſeveſmall ones, yet the Quantity of elaſtick uid us'd in the Inflation, together with e Swelling of the large Bladder, will be much greater than when a Weight is rais'd by a String of ſmall ones. The Doctor illuſtrates this further by inſtancing in Bladders, to which we refer, and ſhall conclude with one Obſervation of his, that in determining both the Contraction and Strength of a Muſcle, no Regard is to be had to the Tendons; becauſe in them we obſerve no Inflation, and we find Nature no where making uſe of a Tendon, but where either there was not Room for the Inſertion of ſo many fleſhy Fibres, or where 'twas neceſſary the Muſcle ſhould draw from ſuch a Point.

He concludes with an Eſſay how to determine the Force of the elaſtick Fluid neceſſary to diſtend the Veſicles, ſo as to raiſe any Weight to a determined Height. For this Purpoſe he endeavours to find out the Figure that each Veſicle will be form'd into by the Force of the elaſtick Fluid diſtending it. But we refer to his Book for the Method and its Solution.

Myographiæ Comparatæ Specimen: *Or, A Comparative Deſcription of all the* Muſcles *in a Man, and in a Quadruped; ſhewing their Diſcoverer, Origine, Progreſs, Inſertion, Uſe and Difference. To which is added, an Account of the* Muſcles *peculiar to a Woman. By* James Douglas, M. D.

THE Doctor ſays in his Preface, That though Myography has been often cultivated by good Hands, it ſtill afds a large Field for Reformation and Imvement, as will appear by this ſmall atiſe. He does not pretend to have corted all the Miſtakes, or ſupply'd all the fects, of others who have wrote upon the ject, and doubts not but he is liable to rrection in many Things.

But he was encouraged to publiſh this k, becauſe he took all his Deſcriptions from ocular Inſpection in diſſecting, without taking any Thing upon Credit from others. Before he was determined as to the Origine, Progreſs and Inſertion, of the Muſcles, he rais'd them on both Sides of above 12 Subjects, both *Fœtus's* and Adults, wrote down his Obſervations, and peruſed all that have wrote upon Muſcles from the Time of *Galen* till now. After comparing the Deſcriptions together, he ſingled out ſuch as he found conformable to the Life, that being the Standard by which he directs himſelf, and

according to which he has rectify'd the Miſtakes, and ſupply'd the Defects, of others, as far as his Obſervations go.

He takes Notice, that in the many Bodies he has view'd, he has not met with that Frequency of *Luſus Naturæ* ſo commonly talk'd of, eſpecially by thoſe who are loth to take Pains to make a ſtrict Inquiry in the Diſſection of thoſe uſeful Machines of Motion; yet he owns that Nature does ſometimes ſport and vary in the Compoſition of a Muſcle. Thus he has obſerv'd two *Palmaris's* in one Hand; he has found three Heads to the *Biceps Cubiti*, the uncommon Head ariſing from the Middle of the *Os Humeri*; and he has ſeen one of the *Interoſſei* come from the upper Part of the *Carpus* externally, *&c.*

As for the Comparative Part of this Treatiſe, or the Interlacing the Deſcriptions of the Humane Muſcles with thoſe of the Canine, he preſumes it needs no Apology. The many uſeful Diſcoveries from the Diſſection of Quadrupeds is a warrantable Plea for inſiſting upon it, tho' it may be cenſur'd by the Vulgar.

He was induced to make the Parallel between the Muſcles of a Dog and a Man for two Reaſons:

1. The Opportunity of ſhewing the Contrivance and Uſe of the Muſcles ſubſervient to the peculiar Motions of a Dog, and ſuch as its different Way of Living did neceſſarily require; for where Nature has acted uniformly, he is ſilent; but when any Difference appears in reſpect of the Origine or Inſertion, there he makes Comparative Remarks.

2. For the Benefit of young Students of Anatomy, who may readily procure ſo common a Subject, and if they once acquire a Dexterity of raiſing the Muſcles in it, may promiſe themſelves an equal Ability in raiſing thoſe of the Humane Body after the Diſſection of one or two at moſt. He quotes *Galen* for his Pattern, who recommended to his Scholars the frequent Diſſection of Monkeys and Apes, as highly conducive to a more perfect Knowledge of the Structure of the Organs of the Humane Body; and he obſerves, that the Deſcriptions of the Muſcles in his *Adminiſtrationes Anatomicæ*, and in his Book *de Diſſectione Muſculorum*, are chiefly taken from Apes; but the Account of the Uſe of them in his admirable Book *de Uſu Partium* are all taken from Men.

The Doctor uſes the ſame Method that's follow'd at *Surgeons-Hall* in *London*, which he ſays is the moſt illuſtrious School of Anatomy now in *Europe*.

All the Muſcles diſcover'd and deſcrib'd by *Galen* ſtand here without any Name or Mark affix'd, to the others he adds the Names of their reſpective Diſcoverers, and thoſe which he has diſcover'd himſelf have three Stars ſet after their Names.

In his Introduction, he gives a ſhort Account of the Structure and Compoſition of Muſcles in general, and premiſes what is meant by a Fibre and a Membrane. A Fibre, in *Greek* Ἶς, in *Latin Fibra*, is properly thoſe *Villi* or Strings that hang at the Roots of Plants, but in Anatomy may be deſcribed, *a Subſtance in Figure like a fine Thread, of a tenſil and irritable Nature, by the various Texture and Combination of which, all the ſolid Parts of the Humane Body are framed.*

Theſe Fibres are divided into Membranous, Carnous, Cartilaginous, Oſſeous and Nervous. The Doctor only deſcribes the Carnous, which he ſays are vaſcular and hollow, full of little Cells, and call'd *Fibræ Motrices*, becauſe the chief Organs of Muſcular Motion. The Fibres are alſo diſtinguiſh'd, by their Situation and Courſe, into *Straight*, which run lengthways or in right Lines; *Circular*, which run round ſome Part; *Tranſverſe*, which interſect ſtraight ones at different Angles; or *Oblique*, which cut both the ſtraight and tranſverſe at unequal Angles.

A Membrane is a broad, thin, white, dilatable Subſtance, interſpers'd with ſeveral Sorts of Fibres like a Web. In *Greek* 'tis call'd Ὑμὴν, Μῆνιγξ, and Μεμβράνη, which *Hippocrates* and *Galen* uſe indifferently to denote one and the ſame Thing; but later Writers appropriate them to particular Membranes. Thus *Hymen* is applied only to the circular Fold of the inner Coat of the *Vagina Uteri*, placed near its outer Orifice; *Meninx* to the Membranes that involve the Brain; and Χιτὼν ſtrictly denotes a Membrane or Coat. In *Engliſh*, Membrane in a large Senſe comprehends all the Coverings that inveſt the ſolid or contain the fluid Parts, with different Names ac-

ecording to the Parts they incloſe. Thus hat which covers the *Cranium* or Skull is all'd *Pericranium*, that which lines the Inide of the *Thorax*, *Pleura*; that which inveſts the *Abdomen*, *Peritonæum*; that which dheres to the Surface of all the Bones, *Periſteum*. Beſides that the Membranes of ſome articular Parts have particular Names.

All the Membranous Fibres have a Sort of Elaſticity or Spring, whereby on Occaſion hey can very eaſily extend and contract hemſelves again, as may be obſerv'd in the *Peritonæum*, *Stomach* and *Uterus*. The Nervous Filaments interlaced between them, nd pouring in the Animal Spirits, make hem extremely ſenſible, whence the Anients were led into a Miſtake, in affirming hat the Membranes were the true Organs of eeling.

Every Membrane is manifeſtly double, nd between the Duplicature the Veſſels un; and in the Fiſſure of their inner Membrane there are placed Abundance of ſmall Glands, which ſeparate an Humour for noiſtening them, and thereby hinder preternatural Adheſions to the Parts they touch, which always happen to any of the *Viſcera* ffected with a *Scirrhus*, which in ſuch a aſe adheres firmly to all the neighbouring arts.

The Uſe of the Membranes is to wrap up nd cover the Parts, to ſtrengthen them, to efend ſeveral of them from being hurt by he ſubjacent Bones, to ſuſtain the Veſſels hat are ramified upon them, to keep the arts united; and 'tis worth our Obſervaion, that the admirable Sympathy or Conent of the Parts one with another depends n a great Meaſure upon their fibrous Conexions.

All that ſoft Part of the Body the Vulgar call Fleſh, is by Anatomiſts diſtinguiſh'd nto various Parts or Parcels, which they all Muſcles.

A Muſcle is nothing but a Bundle of fleſhy nd tendinous Fibres incloſ'd in a proper Membrane, by Means of which all the Motions in an nimal Body are performed.

The *Greek* Name is Μῦς, *i. e.* Mouſe, beauſe ſome of them are like that Animal hen ſtrip'd of its Skin; or others derive from μυεῖν, to contract, which is the proer Action of a Muſcle.

A Muſcle is commonly divided into the Head or Beginning, Body or Belly, and Tail or Ending; or into the Middle, and two Extremities. The Head is that which ariſes from the moſt ſtable Part, unto which the Contraction is made; for 'tis a conſtant Rule, that every Muſcle moves towards its Beginning, which from thence may be call'd the Center of its Motion.

The Origine of a Muſcle is for moſt part tendino-carnous, ſometimes entirely tendinous, and ſometimes only fleſhy.

The Tail or End is that Part implanted into the Member which is to be moved. This Extremity is commonly call'd its Tendon, the Subſtance of which is the ſame with the reſt of the Muſcle, only its Fibres being cloſely compacted, for the Conveniency of having a greater Number of them inſerted into a narrow Place, they feel harder and appear whiter; ſo that the fleſhy Fibres of a Muſcle are only its Tendons divided and looſe, and the Tendon is nothing but theſe very Fibres cloſely united, as *Spigelius* expreſſes it.

'Tis probable that every Muſcle either begins or ends tendinous, (with this Difference, that ſome of them end in the *Periоſtium*, though the greateſt Part do penetrate that Membrane, and are immediately inſerted into the Bone) the ſtronger and more conſpicuous being extended beyond the fleſhy Part, and not ſo diſcernable, lie either hid under the Fleſh, or interlaced between its Fibres.

'Tis neceſſary to know that the Head and Tail of a Muſcle are convertible Terms; for according to the different Situation of the Body, thoſe Extremities do ſo alter, that the Part which was before immoveable and fix'd becomes moveable.

The Belly of a Muſcle is the middle Part of it, which conſiſts of fleſhy Fibres, red, lax and ſpongeous, as may be diſtinctly obſerv'd in a Piece of parboil'd Fleſh. Each Fibre is made up of a vaſt Number of little *Fibrillæ*, which are ſo many ſlender hollow Pipes bound about by ſmall tranſverſe parallel Threads, which divide the *Fibrillæ* into a great many *Veſiculæ*, that have no Communication with one another, but only entertain the Blood and Spirits for the Action of the Muſcles. The red Colour of the

fleſhy

fleſhy Fibres is owing to the Blood they receive; for upon injecting warm Water plentifully into the Arteries, the Redneſs abates, and the Fibres put on the ſame Colour with theſe diſtractile Tubes.

The proper conſtituent Parts of a Muſcle are thoſe already deſcribed.

The common are Arteries, Veins, Nerves, Lymphæducts and Fat. The Arteries impart the Blood, the Veins convey it back to the Heart. The Nerves bring Animal Spirits upon any Impreſſion communicated to them from the Mind. The Lymphæducts perhaps carry back the Remains of the nouriſhing Juice to be refunded into the Venal Maſs; and the Fat between and upon the Fibres lubricates and renders them fitter for Action.

A Muſcle is either ſingle or compound. In the firſt, all the fleſhy Fibres run parallel to one another; in the latter, they run in ſeveral Planes, croſſing one another, or in different Courſes.

All Muſcles which ſerve for the ſame Motion are call'd *Congeneres*, becauſe they aſſiſt one another in Action; and theſe which are the Inſtruments of oppoſite Motions are named *Antagoniſtæ*. For Inſtance: Every *Flexor* or bending Muſcle has a *Tenſor* or extending Muſcle; and 'tis a conſtant Obſervation, that when one of theſe Muſcles is ſhorten'd, the other is extended; for the Shortening of the Muſcle which acts, muſt needs produce an Extenſion of its Antagoniſt.

The Uſe of the Muſcles is to perform all the different Motions of the Parts by contracting themſelves; for when the *Fibrillæ Motrices* are ſhorten'd, the moveable Part muſt of Neceſſity be drawn towards the fix'd, or the Part from which the Muſcle does ſpring, and that into which 'tis inſerted muſt needs be brought nearer each other. So much for the Introduction.

We come now to the Book it ſelf, which being deſign'd only as a Manual for Students who attend Anatomical Lectures, *&c.* 'tis enough to give a brief Account of its Contents.

The Firſt Chapter treats of the Muſcles of the *Abdomen*, *viz.* the *Obliquus Deſcendens*, *Obliquus Aſcendens*, *Pyramidalis*, *Rectus*, and *Tranſverſalis*; and his Method is to give an Account of their Origine, Inſertion and Uſe, which he obſerves in every Chapter.

The Second treats of the Muſcles of the *Teſtes*, *viz.* the *Dartos* and *Cremaſter*.

The Third of the Muſcles of the *Penis*, *viz.* the *Erector Penis* and the *Accelerator Urinæ*.

The Fourth of the Muſcles of the Skin of the *Os Occipitis* and *Os Frontis*, *viz.* the *Muſculus Frontalis verus ſeu Corrugator Coiteri*, and *Occipiti Frontalis*.

The Fifth of the Muſcles of the Eyelids, *viz.* *Aperiens Palpebrarum Rectus* and *Orbicularis Palpebrarum*.

The Sixth of the Muſcles of the Eyes, *viz.* *Obliquus ſuperior*, *Obliquus inferior*, *Elevator*, *Depreſſor*, *Adductor & Abductor*.

The Seventh of the Muſcles of the Noſe, *viz.* *Rinæus vel Naſalis*.

The Eighth of the Muſcles of the Lips, *viz.* *Zygomaticus*, *Elevator Labiorum communis*, *Depreſſor Labiorum communis*, *Sphincter Labiorum*, *Elevator Labii inferioris proprius*, *Elevator Labii ſuperioris proprius*, *Depreſſor Labii inferioris proprius*, *& Depreſſor Labii ſuperioris proprius*.

The Ninth of the Muſcles of the Cheeks, *viz.* *Buccinator*, and the *Quadratus Genæ vel Latiſſimus Colli*.

The Tenth of the Muſcles of the External Ear, whoſe Number he ſays is uncertain.

The Eleventh of the Muſcles of the Internal Ear and Auditory Paſſage, *viz.* *Externus Auris*, *Internus Auris*, *Obliquus Auris vel Externus*, *Stapidæus vel Muſculus Stapedis*, *& Muſculus Meatus Auditorii*.

The Twelfth of the Muſcles of the *Os Hyoides*, *viz.* the *Mylohyoidæus*, *Geniohyoidæus*, *Stylohyoidæus*, *Stylo-Chondrohyoidæus vel Stylohyoidæus alter*, *Coracohyoidæus*, *& Sternohyoidæus*.

The Thirteenth of the Muſcles of the Tongue, *viz.* the *Genioglоſſus*, *Ceratoglоſſus*, *Styloglоſſus*, *& Lingualis*.

The Fourteenth of the Muſcles of the *Larynx*, *viz.* the *Hyothyreoidæus*, *Sternothyreoidæus*, *Cricothyreoidæus*, *Arytænoidæus major*, *Arytænoidæus minor*, *Cricoarytænoidæus poſticus*, *Cricoarytænoidæus lateralis*, *& Thyreoarytænoidæus*.

The Fifteenth of the Muſcles of the *Pharynx*, *viz.* the *Cephalopharyngæus*, *Chondropharyngæus*,

aryngæus, Cricopharyngæus, Glosso, Hyo, Mylo, erigo, Salpingo, Syndesmo, Stylo, & Thyreo-aryngæi.

The Sixteenth of the Muscles of the *Uvu-*, *viz.* the *Glosso, Palato, Salpingo, & Thyreo-aphilini.*

The Seventeenth of the Muscles of the *Tu- Eustachiana, viz.* the *Musculus Tubæ novus Palatosalpingæus.*

The Eighteenth of the Muscles of the ad appearing or situate in the fore and la- al Parts of the Neck, *viz.* the *Mastoidæus, ctus internus major & minor, Rectus Latera- & Musculus Caput concutiens.*

The Nineteenth of the Muscle of the eck that lies on its fore Part, *viz.* the *ngus.*

The 20th of the Muscles of the Lower Jaw, z. *Temporalis, Masseteri, Digastricus, Pteri- dæus internus & externus.*

The 21st of the Muscles of the *Thorax*, z. *Scalenus, Subclavius, Intercostales, Trian- laris, Diaphragma, & Costarum Depressores prii.*

The 22d of the Muscles of the Bladder Urine, *viz.* the *Sphincter* and *Detrusor rinæ.*

The 23d of the Muscles of the *Anus, viz.* *Levator magnus seu internus, & parvus seu ernus*, and *Sphincter.*

The 24th of the Muscles of the *Scapula*, z. the *Trapezius seu Cucularis, Elevator seu uscul Patientiæ, & Rhomboides.*

The 25th of the Muscles of the *Thorax* t appear in the Dissection, the Body ly- prone, *viz.* the *Serratus major & minor icus, Serratus superior & inferior posticus, ro Lumbalis Cervicalis Descendens, & Costa- Levatores.*

The 26th of the Muscles of the Head that pear in the prone Position of the Body, . the *Splenius, Tracholo-Mastoidæus seu Ca- Par tertium, Complexus, Rectus major & or, & Obliquus superior & inferior.*

The 27th of the Muscles of the Neck that on its back Part, *viz. Spinalis, Transver- , Interspinales, Intertransversales.*

The 28th of the Muscles of the Back, the *Longissimus, Semispinalis, & Trans- ales Dorsi interiores.*

The 29th of the Muscles of the Loins, *Spinalis, Transversalis Lumborum, vulgo Sacer, Quadratus, Psoas parvus, & Intertransversales.*

The 30th of the Muscles of the *Humerus* or Arm, *viz. Pectoralis, Deltoides, Supraspinatus, Infraspinatus, Teres minor & major, Latissimus Dorsi, Coracobrachialis, Subscapularis.*

The 31st of the Muscles of the Cubit, *viz. Biceps internus, Brachialis internus & externus, Brachialis externus, Angonæus vel Cubitalis.*

The 32d of the Muscles of the Palm of the Hand, *viz. Palmaris longus & brevis*, or *Caro-quadrata.*

The 33d of the Muscles of the Wrist, *viz.* the *Flexor Carpi Radialis, Flexor Carpi Ulnaris, Extensor Carpi Radialis, & Extensor Carpi Ulnaris.*

The 34th of the Muscles of the Four Fingers, *viz.* the *Perforatus, Perforans, Lumbricales, Extensor Digitorum communis Interossei.*

The 35th of the Muscles of the Forefinger, *viz.* the *Extensor secundi Internodii Indicis proprius, vulgo Indicator, Extensor tertii Internodii Indicis, & Abductor.*

The 36th of the Muscles of the Little Finger, *viz.* the *Extensor Minimi Digiti, tertii Internodii Minimi Digiti, Abductor Minimi Digiti, Hypothenar, Flexor primi Internodii Minimi Digiti.*

The 37th of the Muscles of the Thumb, *viz. Flexor primi, secundi & tertii Internodii, Extensor primi, secundi & tertii Internodii*, the *Adductor ad Indicem, & Antithenar ad Minimum Digitum.*

The 38th of the Muscles of the *Radius*, *viz. Pronator teres & quadratus*, and the *Supinator longus & brevis.*

The 39th of the Muscles of the Thigh, *viz. Psoas magnus, Iliacus internus, Pectinalis, Glutæus maximus, medius & minimus*, the *Pyriformis seu Iliacus externus, Marsupialis seu Obturator internus & externus, Gemini, Quadratus Femoris, Triceps, Abductor Femoris primus, secundus, tertius, quartus.*

The 40th of the Muscles of the *Os Occygis*, *viz.* the *Coccygæus.*

The 41st of the Muscles of the Leg, *viz. Membranosus, Sartorius, Rectus, Vastus externus & internus, Cruræus, Gracilis, Seminervosus, Semimembranosus, Biceps, & Poplitæus.*

The 42d of the Muscles of the Foot, *viz. Extensor Tarsi suralis vel Extensor magnus*, *Exten-*

Extenſor Tarſi minor, vulgo Plantaris, Tibialis anticus, Tibialis poſticus, Peronæus primus ſeu poſticus, & Peronæus ſecundus ſeu anticus.

The 43d of the Muſcles common to the Four leſſer Toes, *viz. Extenſor longus & brevis, Perforatus ſeu Flexor ſublimis, Perforans ſeu Flexor profundus, Lumbricales, Interoſſei.*

The 44th of the Muſcles of the Great Toe, *viz. Extenſor longus & brevis*, the *Flexor longus & brevis*, the *Adductor & Abductor.*

The 45th of the Muſcles of the Little Toe, *viz. Adductor & Flexor primi Internodii Minimi Digiti.*

The 46th of the Muſcle common to the Great and Little Toe, *viz.* the *Tranſverſalis Pedis.*

After this, there's an Appendix concerning the Muſcles of the *Clitoris* and *Vagina* in a Woman, a Liſt of the Muſcles found in the Humane Body that are not met with in a Dog, a Liſt of thoſe peculiar to a Dog, and an Etymological Table of the Muſcles; an Account of what the Doctor obliges himſelf to perform in a Courſe of Human and Comparative Anatomy, and an Appendix to his foregoing Account of the Muſcles.

Adverſaria Anatomica, Medica, Chirurgica. *Taken from ſome ſcatter'd Pieces of Dr.* Frederick Ruyſch, *Mr.* John Jacob Raw, *Mr.* Guevelon, *the Two* Adrians, *Father and Son, Mr.* Catuve, *&c.*

I. IT is obſerv'd from *Ruyſch*, that the *Offıcula* or little Bones of Hearing (which may ſeem ſtrange) are of the ſame Size in the Skulls of every *Fœtus* with thoſe of grown Perſons. It is likewiſe obſervable, contrary to *Valſalva*, the laſt Author that has writ of a Humane Ear, that the *Offıcula* of Hearing are cover'd with the *Perioſteum* and its Veſſels; but *Valſalva* admits Veſſels, but not the *Perioſteum*, which is contrary to all other Anatomiſts: For the Veſſels are always concern'd for Nouriſhment, for which End the *Perioſteum* is always appointed to the Bones. The Cavity under the *Sella Equina*, or four Proceſſes of the Bone *Sphenoides*, or Wedge-like Bone, in Adult Skulls is ſupplied with a ſlender Membrane or Film; and Dr. *Ruyſch* in ſeveral Subjects has obſerv'd, from this Cavity there is a *Foramen* or Aperture into the ſpongy Bones of the Noſe, with which alſo that Tunicle which is in the Cavity ſeems to communicate. In new born Children, no Cavity appears under the *Sella Equina* or Proceſſes of the *Sphenoides.*

II. Concerning *Highmore*'s Cave or Cavity, which is internally diſcover'd in the *Sinus* of each Maxillary Bone, it is obſervable Surgeons and unskilful Anatomiſts are frequently miſtaken, who, if a Hurt be violent or ſucceſſive in theſe Parts, as it commonly happens in the Venereal Diſeaſe, take this for a *Caries* or Rottenneſs of the Bone, eſpecially when they can penetrate ſo deep into it with a Probe, and find this vaſt Cavity.

III. In a little dead Body newly born which was diſſected the 27th of *Dec.* 17[illegible] the Navel-ſtring, as it was obſervable, ſtuck cloſe to the Urinary Bladder by Means of the *Urachus:* But the *Urachus* is not, but the Suſpenſory or Ligament of the Bladder, without Perforation or other Uſe, will appear if you blow Wind into the Bladder, whence you will find the *Urachus* not ſwell at all, but end about the Navel, which, with its adjacent Veſſels, after the Excluſion of the *Fœtus* becomes a Ligament. Sometimes the Skin about the Navel in new born Infants is obſerved to be too thin,

ill riſe on a round Knot, as if it had a anſparent Liquor in it; but in few Days ter their Birth Mr. *Ruyſch* has oftentimes bſerv'd them diſappear.

To know the Diſtinction of Sexes in Skeons is ſomething difficult; but if we enire, it is chiefly to be obſerv'd in that *ink* upon the joining together of the Bones the *Os Pubis*, which is form'd from the nes of the *Iſchium* or *Huckle-bones*, for theſe eld more in Women than in Men. But this Fiſſure or *Chink* be ſtraighter than ornary in Women, 'tis to be fear'd they will ve great Difficulty in Child-bearing, from hich they ſeldom eſcape; for this is called e Womb Looking-glaſs: Neither is it in is or any other Caſes of other Concern. therwiſe, to conſider the Reaſon of Diſtinon of Sexes, we ought to have particular gard to that Difference that is in the Ribs, hich are broader in Women, and ſtraighter Men. The Circumference of the Bottom the Hip-bones is of larger Extent in Wo-n too.

It happens more frequently that the Neck the Thigh-bone is broke by ſome external olence than a great many People believe; the Bones are very ſlender in this Part, d the *Lamellæ*, as they are call'd, brittle e Glaſs: And although it is the common inion of Patients, that the Pain and Loſs Motion proceeds from the Exarticulation Disjointing of the Thigh-bone from its nion with the Huckle-bone, yet that is a ſe Notion, and impoſſible that the Artiation can ſuffer a Luxation, by reaſon of Thickneſs and Strength of the Ligaments d circumjacent Tendons. I ſaw a Fracture, s my Author, and felt it with my Hands the dead Body of a Woman at the Hoſpiin *Amſterdam* call'd the *Peſthouſe*, which Courſe of Time had conſolidated again a *Callus* in the Neck of the right Thighe, yet the Woman was ſound, and had Uſe of the Part to her dying Day. A *us* the Breadth of ones Thumb may be ler the great Head of the Thigh-bone; there can be no Hurt or preternatural nſtitution in the Ligaments and Tendons the Muſcles, all Things are ſo firmly together, and the injured Place ſo well ſolidated by the *Callus*, that though it be with never ſuch Violence, it cannot be broke. Notwithſtanding, it is not to be affirm'd that the Tendons of the Muſcles in Fractures, although they unite again, can bear as much as before, or be able to ſuſtain the uſual Motion of the Feet; to ſay nothing of the Nerves that occur to this Labour, whoſe chief Heads proceed or iſſue from the *Os Sacrum*, and the ſaid Parts of the Tendons and Ligaments.

As to other Fractures of the Bones in general, Mr. *Ruyſch* has obſerv'd, that ſuch Men who are in an ill Habit of Body, of a ſcorbutick Conſtitution, or whoſe Juices are ſizy, and want thoſe uniting Particles neceſſary for the Accretion and Strength of the Bones; in ſuch Caſes, Fractures will never rightly conſolidate. He hath ſeen others in which the ſpongy Part of the Bones or *Meditallium* adheres; but the external *Laminæ* of the Bone not being equally hard, upon every light Occaſion is ſubject again to *Fractures*. For both theſe Evils he has thought it ſufficient to apply Iron Plates towards fortifying the weak Parts.

A *Paracenteſis* or Perforation of the *Thorax* or Cheſt in an *Empyema* is rarely made with the deſired Succeſs, becauſe the purulent or corrupted Matter is incloſ'd in a cavernous Bag, and ſticks to the *Pleura* among the *Intercoſtal Muſcles*. Mr. *Ruyſch* thought it expedient, inſtead of a Penknife or Inciſion-knife, to apply a Potential Cautery to the third and fourth Ribs, to be reckoned from the loweſt. The beſt Cauſtick for this Uſe, is that made of Quicklime and a *Lixivium* of Soap Aſhes, form'd into the Conſiſtence of a Stone. He adviſes concerning Trepanning, and informs the World that he always treats the wounded Part with Cephalick Fomentations for 24 Hours; and if in that Time the Symptoms did not abate, then at laſt to proceed to the *Trepan*, which is an Operation very troubleſome and difficult.

The 13th of *January*, 1706. the publick Hoſpitals afforded the Body of a Woman who died in Child-bed, and this was for Information to the Midwives, the Magiſtrates of *Amſterdam* having ordered that there ſhould be frequent Diſſections of this Kind for the Improvement of the Art of Midwifry. But before Mr. *Ruyſch*, whoſe Buſineſs this was, demonſtrated the Subject to the

Midwives, he ſhew'd the Scholars that were his Pupils the moſt rare Anatomical *Phænomena* of the Parts. The Womb appear'd in Women with Child towards the upper Parts of the *Ileon* and *Jejunum*, and thruſts up the *Liver*, *Stomach* and *Diaphragm*, into the *Thorax*, ſo that it is difficult for them to breath. The Womb being cut in Form of a Croſs, appears as thick as it was before the Impregnation, although it has admitted of that prodigious ſpherical Extenſion; which may ſeem incredible to thoſe who do not conſider the vaſt Swelling of the middle Vaſcular Tunicle of the Womb, which grows every Day ſucceſſively with the *Fœtus*. The Tunicles of the Womb are properly Three: The outermoſt is ſmooth, the middle ſpongy and full of Blood-Veſſels, and the innermoſt ſoft and glandulous, to which the After-birth is fix'd, tho' not very firmly, and theſe are united to the Membranes in which the *Fœtus* is wrap'd. Thoſe two Membranes are the *Chorion* and the *Amnios*, which at firſt Sight may ſeem to be but one, and yet with little Difficulty may be ſeparated from one another with the Fingers. In this Subject, the *Fœtus* appear'd juſt ready for Excluſion, from whence might be obſerv'd the inward Orifice of the Womb by a little Dilatation, the Largeneſs or Size of which Orifice would at this Time admit two Fingers. I took particular Notice of the *Placenta* or After-birth, that it was not ſo grumous and divided as it ſeem'd after Extraction from the natural Part, when it had been touch'd by the Midwife's Hands. It is cover'd with a peculiar Membrane, which Mr. *Ruyſch* calls *ſuccous* or juicy, with the Membrane of the *Chorion*, and a continued Inoſculation of the Subſtance of the Womb. In the Neck of the Womb of this Child-bearing Woman, we obſerv'd ſeveral gaping Pores about the Orifice of the *Urethra*, with which ſometimes unskilful Surgeons are deceived in ſearching for the Stone, and taking theſe for the *Urethra*; which Error they may eaſily rectify, by knowing that the Orifice of the *Urethra* is ſituated juſt a Thumb's Breadth from the *Clitoris* in a right Line. It is ſingular what the Famous *Ruyſch* has obſerv'd concerning *Fallopius*'s Tubes, to wit, that in thoſe Women who have lately conceived, that Tube by which the inflamed Egg paſs'd does appear to have a Cavity conſpicuous at its Inoſculation with the Womb.

As long as the *Fœtus* is ſhut up in the Confines of the Womb, it is difficult to paſs a Judgment of Life and Death, which is yet highly requiſite at the Time when the Queſtion ariſes, Whether the Mother ſhould not be ſaved by extracting the Child by Force? Neither is there any Sign of the Child's being dead in the Womb ſo ſure, as that which is taken from the Navel-ſtring; for if it be flabby, and have loſt its Pulſation, you may proceed ſafely to work, and diſcharge your Conſcience. Mr. *Ruyſch* has ſaid, that the Sign of a dead Child is taken from the Lungs, which remain ſmooth; but if the Body has been dead ſome Time, and expoſ'd to the free Air, it ſhall ſo change the Structure of the Lungs by a ſupervening Fermentation, that they will ſwim above Water, notwithſtanding the Child was dead in the Womb; but if it ſo happens that the Child expires in the Neck of the Womb, during that Time it ſhall not be capable of receiving any Air into the Lungs.

Before I proceed further with the Diſſection, I ſhall obſerve to you ſomething of Abortions, which have been procur'd by wicked and vile Proſtitutes: Some, to ſave their Modeſty, ſtill paſs upon the World for chaſt Virgins; and others to prevent the Charges of the Proſecution of the Law. For the Love and Value ſome ſet upon Reputation and a good Name is ſo great, that they will ſell their Conſciences and Religion to purchaſe that; and a little ſtolen Pleaſure, eſpecially in the Acts of Venery, is eſteem'd by ſome Women worth their hazarding both Soul and Body for in this World. What a vaſt Number of Souls periſh by the Artifices of Poiſon, and other foul Practices to deſtroy the *Embryo's*, it may be after three or four Months being gone with Child? But if it happens, that, through Ignorance or imprudent Negligence, they go out their whole Time, and bear a Child alive, what Machinations and Devices are there made to thruſt it out of the World, and what they could not effect before the Birth with Craft, they make up afterwards with Cruelty? I tremble when I call to Mind what *Patinus*, who was an incomparable Philoſopher and Phy-

Phyſician, has ſaid in ſome Letters of his writ in the *French Tongue*. A Letter to Mr. *Falconet*, 1660. the 27th of *July*; and another printed at *Paris* in the Year 1692. where he takes Notice of a Midwife, who in his Time had her publick Puniſhment ſuſpended, though ſhe had killed a *Fœtus* by perforating the Womb of a certain Woman by an Inſtrument to procure Abortion, or a Miſcarriage, but with ſuch unhappy Succeſs, that the Mother being ſeiz'd with Convulſions, expired in a great deal of Miſery. This wicked Midwife, in her Confeſſion before the Criminal Judge, own'd, that ſhe had by this Method ſucceſsfully procured Abortions in many Women.

Upon another Occaſion, Mr. *Ruyſch* form'd a demonſtrative Diſcourſe upon Blood-letting. It is obſervable, that the moſt common Places to take Blood are in the Cephalick, Baſilick, or Middle Veins of the Arm. The Cephalick or Head Vein is ſeated on the Outſide, as the Baſilick is on the Inſide, of the Arm. But where theſe two Veins meet by the *Anaſtomoſis* of their Trunks, which is below the Bending of the Arm, there the Middle Vein ariſes, which is not ſo commonly cut as the ignorant Vulgar think, for ſometimes it is hid under the Muſcles; but the Cephalick is moſt commonly cut, or a Branch of it, in the Bending of the Arm, or a little above; for the Baſilick, or, as it is called by ſome, the Hepatick, is more dangerous to cut, by reaſon of its adjacent Nerves, or the tendinous Part that lies under it, which forms the Muſcle call'd the *Biceps*, being the firſt Muſcle of the *Cubitus*, and being wounded, produces grievous Symptoms.

In the Demonſtration of the Parts ſerving for the Secretion of Urine, and the Uſe of the Bladder, he propos'd a curious and choice Obſervation of the falling down of the Bladder into the *Scrotum* or *Cod*, which he ſolemnly atteſted he had met with twice in his Practice: And that the Bladder deſcended the ſame Way into the *Scrotum* that the Guts us'd to do in a Rupture; and that the moſt certain Sign of this Effect was, when the Party could not make Water without ſqueezing the upper Parts towards the *Scrotum*.

Theſe were the Things which I took Notice of from the Famous Mr. *Ruyſch*'s own Mouth in his Lectures and Obſervations that he made to his Scholars. I ſhall now ſpeak of another Maſter of mine, Mr. *John Jacob Raw*, an Ornament and Glory to his Country, a moſt incomparable Anatomiſt and Surgeon, who in his Judgment and Experience in Cutting, may be allow'd even to excel the dextrous and diligent *Veſalius*. I purſued the Directions and Precepts of this extraordinary Man near five Months in Anatomy and Surgery: Therefore what I ſhall communicate are the Obſervations of that finiſh'd and compleat Anatomiſt, and thoſe Things which appear'd moſt remarkable from his Inſtitutions and Inſtructions. There are Abundance of other Things which that eminent Anatomiſt might do, to expoſe the Cheats and Errors that Pretenders to Anatomy make uſe of; if he would publiſh them, they would contribute to the Admiration of all, as well as the Health of many Thouſands, and the Honour as well as Proficiency of the Art. But if theſe trifling Lucubrations of mine, and this little Eſſay of Anatomy ſhould come before ſo conſiderable an Anatomiſt, I hope he will not judge hardly of me, that I have not been aſhamed to publiſh ſome particular Thoughts and Notions of his. But I ſolemnly proteſt, I do this out of a publick Eſteem, that the Students of Anatomy may ſee the Tracks and Footſteps of Anatomy truly taught, that which is really Natural, and not that which is daub'd or gilded over with falſe Colours by ſuch Anatomiſts as have got a Reputation without deſerving it, but impoſe upon their Scholars or Diſciples for Want of a true Foundation of ſolid Experience and Obſervation.

Mr. *Raw* has made an excellent Diſcovery of the true Seat of the Articulation of the Lower Jaw-bone with the Upper in a *Skeleton*; for this has been a conſtant Error in all *Skeletons*, and natural Draughts, the Lower Jaw-bone ſeeming to be articulated in that Place where the Clinoide Cavity meets with the Inſide of the Bones of the Temples, great Part of which in a living Subject is almoſt always replete with Fat, and the Space gives Way or yields to the uniting *Apophyſes*, but in Motion eſpecially, to wit, that the Lower Jaw-bone might move backward

without Impediment: But the true Place of the Articulation is near the *Zygomatick Proceſs* or Jugal-bone, about the Temples, in a tranſverſe Eminency, to which the Cartilage intervening, we may plainly ſee the Lower Jaw-bone articulated. But if from a Fall or other Accident the Lower Jaw be disjointed, then it may be that almoſt all the *Condyloide* or uniting Proceſs ſinks into the *Clinoide* Cavity: But this happens only in a preternatural State, and then the Man is hinder'd from Chewing, except by the Aſſiſtance of a dextrous Surgeon, the Lower Jaw-bone be ſtretch'd out, and reduced to its former Place.

Of the *Maxillary* Bone properly ſo call'd, or the Upper Jaw-bone, which is a little ſtraighter than the other, and has an Orifice opening into the Noſtrils. He has aſſign'd the ſame Uſe to this *Sinus* or Duct, as to the *Frontal* and *Sphenoide* Ducts; not, in the firſt Place, as thoſe are made to form the Sound of the Tone; but, in the ſecond Place, to ſerve for reſtoring the Mucous to the Noſtrils; for the ſaid *Sinus's* are indeed nothing elſe but Receptacles for the Mucous of the Noſe, ſo that there may be Plenty of that at all times, which flowing every where from hence, in whatever Poſition the Head is placed, it may ſufficiently water the *Pituite Membrane*, inveſting the little Cells of the ſpongy Bones. It is worth Obſervation to take Notice, that the Smell would not be maintain'd by the Inſpiration and Expiration of the Air only, which would render the Parts too dry, without a continued Flux of this Humour, which preſerves the Paſſages moiſt, and ſo the Impreſſions are render'd agreeable to the ſmelling Organs by the Air, which may affect the Nerves in a due Manner. From hence it appears, there is ſuch an Expanſion of the Pituite Membrane in a little Space; for it inveſts all the foreſaid *Sinus's* and ſpongy Cells of the Bones, that the Particles of Odours convey'd thro' the Air may touch them in a larger Superficies. And this is the Reaſon that the Scent of Things remain with us ſometimes after the Subject is remov'd, when ſome ſmall Particles of the Odours get in among the Interſtices or Chinks of the Cells. Hence it is, that ſome Animals who have larger Cells have their Smell more perfect and laſting, as is evident in Dogs.

The lower ſpongy Bones of the Noſe, which by the *Moderns* are ſaid to be the *Apophyſes* of the *Maxillaries*, Mr. *Raw* has determined to be a ſingle Pair of Bones of the Upper Jaw; for the Noſtrils in grown Perſons may be ſeparated by a skilful Hand from the Bone of the *Ethmoide Proceſs*, or that Sieve-like Bone in the inner Part of the Noſe full of little Holes, to receive the ſerous and pituitous Humours from the ſoft pappy Proceſſes of the Brain; and thoſe Bones in the Noſtrils are ſo eaſily divided, and fall of their own accord, that in ſeveral Scul's in Church-yards and Charnel-houſes they are wanting.

You will find a great Diſagreement among Anatomiſts about the *Foramina* or Holes that occur for the Tranſmiſſion of the Nerves in the Skull. The beſt Method that appears to me is that of my Maſter *Raw*, who in his *Oſteology* does not, as others make them, reckon the *Foramina* of the Skull peculiar or ſingular to each Bone; but after his Deſcription of all the Bones of the Head, he proceeds ſo, that he takes Notice of every particular Bone according to its natural *Compages* or *Conſtruction*; for the *Foramina* are compos'd ſometimes of many Bones together, from whence they have vainly imagined to divide them into ſingular or diſtinct Bones. He reckons Ten internal *Foramina* of the Skull, beginning from thoſe which are form'd for the Olfactory Nerves. By the Second *Foramen* paſſes the beſt or choicest Pair of Nerves. The Third *Foramen*, which is an unequal one, ſerves for four Pair, *viz.* the Mover of the Eyes, the Pathetick Pair, the Paſſions; the firſt Ophthalmick Branch of the fifth Pair; the ſixth Pair of Nerves for governing the Muſcles of the Eyes, which others call *Timidum*. The Fourth *Foramen* tranſmits the ſecond Branch of the ſixth Pair that runs to the Upper Jaw. The Fifth *Foramen* from the third Branch of the fifth Pair ſerves the Lower Jaw. By the Sixth *Foramen* enters a Branch of the Artery ſpringing from the external Carotide Trunk. The Seventh *Foramen* admits the internal Carotide. By the Eighth *Foramen* enters the ſeventh Pair of Nerves, call'd the *Auditory*. The

he Ninth is form'd for the Reception of e eighth Pair of Nerves, call'd the *Vagum*. he Tenth, which is often double with the nth Pair, is call'd *Linguale*, or the Pair of erves belonging to the Tongue. To theſe long the greateſt *Foramen* of the Skull, by hich the *Medulla Oblongata*, the tenth Pair ewiſe, the Arteries of the *Vertebræ*, and *illis*'s Spinal Nerves, all iſſue forth. You y ſee what a Diſtribution of Nerves r. *Raw* makes. He reckons *Willis*'s Pairs of erves not to be ten, but barely nine; beuſe the laſt Pair, which *Willis* calls his nth, rather has Relation to the Neck; and erefore rightly calls that Pair the firſt Pair Nerves of the Neck, becauſe he has obv'd them to proceed from the firſt and ſend *Vertebræ* of the Neck.

Of the Eleventh Pair of Nerves of the ain, which Mr. *Bidloo* reckons with the her Nerves of the Brain, and with the utoſt Injuſtice to *Galen*, attributes the Invenon to himſelf; Mr. *Raw* is of this Opion, that it is true that the ſaid Nerve proeds out of the Bones of the Skull, as has en very well known, but that it comes t of one and the ſame *Foramen* with the hth Pair, leaving the ſame in the Muſcle ll'd the *Trapezium*, reſembling a Monk's owl: But becauſe this Nerve is not of the bſtance of the Brain, for as much as it is ntain'd in the Bones of the Skull, it proeds from the Spinal Marrow, ariſing beixt the ſecond and third *Vertebræ*, and abrdly referr'd by *Bidloo* to the Nerves of the ull, but rightly call'd by *Galen* formerly Nerve on the Side of the *Medullæ Oblonæ*. Thus much of the Head. I ſhall w ſay ſomething of the Limbs, which r. *Raw* communicated to us: And firſt of *Carpus* or *Wriſt*, with its due Diſpoſition it appears in the *Skeleton*. The moſt reirkable Articulation of this, and the Union pears ſo difficult, that thoſe Anatomiſts o underſtand the Oſteology in the *Skele-*, obſerve this Part preſently, which if it not diſpos'd in due Order and Form, the xterity and ſolid Knowledge of the Anamical Artificer is ſoon diſcover'd, more an in the Whiteneſs of the Bones, and her Trifles eſteem'd by the Ignorant. Therefore he ſhew'd us how to diſpoſe the Bones the *Carpus* after this Manner: The *Carpus* or *Wriſt* has eight Bones, whoſe Poſition by reaſon of their Irregularity we cannot deſcribe; but they make a double Joint or Articulation, one with the *Radius* and *Ulna*, the other among themſelves, which is made thus: The fourth little Bone of the firſt Order ſcarce makes any Thing to the Articulation; but the ſuperior only adheres to the little interior Bone of the three ſmall Bones of the firſt Order, and receives the Tendon of the Muſcle of the internal Bender of the Wriſt. Theſe three little Bones of the upper Part or firſt Order, join'd by a cloſe *Diarrhoſis*, forms the ſuperior Head, which is articulated for the moſt part with the *Radius* and *Ulna*, making below a Cavity, which receives the form'd Head from the two little Bones of the ſecond Order; ſo that you may ſee there is a double Order of theſe Bones; for the firſt Order has four little Bones, the ſecond as many, and there is a double Articulation, one with the *Radius* and *Ulna*, the other with the three little Bones of the firſt Order. Beſides, the Order is to be ſo diſpos'd of theſe little Bones below, that you may leave a deep Cavity for the commodious Paſſage of the bending Tendons of the Fingers, Nerves and Arteries which belong to the inward Part of the Hand.

The Famous Mr. *Raw* obſerv'd ſomething to us of great Curioſity as well as Uſe concerning the Generation of the Teeth. *Kirkringius* ſome time ago put forth a Piece of the Generation of the Bones of a *Fœtus*, writ with wonderful Diligence and Accuracy of Judgment; but that which is ſtrange, there is nothing to be met with concerning the Teeth or their Generation. Our Anatomiſt diſcours'd of this Thing to us with ſingular Perſpicuity and Care, after this Manner: He ſaid, it was admirable that the Seeds of all the Teeth ſhould lie hid in the Sockets of the Gums or Jaws, and that as many Seeds as lay there latent, ſo many Teeth a Man ſhould have in his Life; and that he could demonſtrate to the Eye theſe Seeds that were hid in the Gums of a new born Child: That every *Fœtus* contains the Seeds of the compleat Number of Teeth which he is to have, and which are Fifty two; for beſides Thirty two Teeth which every perfect Man has, there are the Footſteps or Tracks of twice

Twenty

Twenty more to be found in every Infant: For Nature has ſo appointed, that there ſhould be 8 Cutters, 4 Dog Teeth, and 8 Grinders, which fall or drop out about the 6th, 7th, or 10th Year of Age, to be reſtored by thoſe that lie hid in the Gums, and are to ſupply their Places. There is a Neceſſity for the firſt to fall out, becauſe the Subſtance of the next are to be harder and more compact than that of the Jaws. What is further remarkable as to the Structure of the Teeth, is, that the internal Cavity of the Teeth, compared with the Membrane that inveſts the external Root, is much the ſame as the internal and external *Perioſteum* of the Bones. And this Mr. *Raw* demonſtrated to us in cutting a Tooth lengthways that was fill'd with Wax, which Filling of the Veſſels might likewiſe be done without Wax from the Blood it ſelf (for Example ſake) if the Jugular Veins of a Dog were bound.

In *Myology*, or a Deſcription of the Muſcles, Mr. *Raw*'s Obſervation is very well worth our Notice concerning the extending Muſcles of the Neck, Back and *Lumbares*: For when moſt Anatomiſts call the Extenders of the Neck two, *Tranſverſe* and *Spinal*; thoſe of the Back and *Lumbares* three, with various Names, the *Sacrum* or *Sacro-lumbarem*, the *Longiſſimum Dorſi*, and *Semiſpinoſum*; Mr. *Raw* only admits of one Pair of Muſcles, which extends the Neck, Back and Loins, as far as the Articulation admits of this Pair, ariſes partly tendinous, and partly carnous, in its Beginning, from the poſterior and ſuperior Part of the *Os Sacrum*, and ſeated betwixt the Cavity which is made from the Spinal *Apophyſis* of all the *Vertebræ*, and the poſterior Part of the Ribs. It produces a vaſt Number of Tendons, which are as it were implanted in the Spinal and Tranſverſe *Apophyſes*.

All the Tendons of the Muſcles of the Fingers, Hands and Feet, have a *Vagina* or Bag form'd of their own proper Subſtance. In theſe Bags are always a Liquor, which is by Nature the ſame with that Liquor which is collected and found in the Articulation of the Joints. Of the common Muſcles of the Thigh and Leg, there are broad ſpread Membranes, which many have taken for the Muſcle call'd the *Abducens*; but upon accurate Diſſection, it has been found only to be a skinny Muſcle, firmly binding the other Muſcles ſubject to it. This does not properly move the Bone, becauſe there is little or nothing inſerted to it.

The Muſcles of the *Pharynx* or upper Part of the Gullet, which by the moſt Curious are reckon'd five Pair, are only three nicely ſpeaking, to wit, two which dilate the Gullet, call'd *Stylopharyngæi*, and one which deſerves to be call'd the *Sphincter* of the Gullet, from conſtringing it. From this *Sphincter* the over-wiſe have made two Pair of Muſcles, call'd the *Pterygopharyngæus* and the *Thyropharyngæus*.

In the Shoulder, the *Rotundus minor* and *Infraſpinatus* make but one Muſcle. It is to be obſerv'd in the Muſcles of the *Cubitus*, that the *Longum*, *Brevem*, and *Brachiæus externum*, only conſtitute one Muſcle, which has a triple Head, but one moving Point. The *Anconæus* is nothing elſe but a Thruſting out or Protruſion of the other *Extenſors* of the *Cubitus*.

You'll find among few Authors any Mention made of the Muſcles of the *Clitoris*, or at leaſt a very obſcure Deſcription; but I ſhall give you a more accurate Account of the ſame from the Diſſection of a Girl of ten Years of Age. There are two Muſcles of the *Clitoris*, one on each Side, which adhere to the *Os Pubis* on the inward Side below, the Extremities of them running on both Sides with their Fibres, involv'd in two nervous Bodies, conſtituting or forming the *Clitoris*, which is nothing elſe but the End of theſe two Muſcles ending in two nervous Bodies, the *Cuticula* or skinny Part being conſtantly hid by the *Nymphæ*, tho' it appears with many Nipples, like that of the Glands of the *Nymphæ*. The Uſe of theſe Muſcles is to cloſe or tie up the Veſſels of the nervous Bodies, and to hinder the Return of Blood; from whence by the Arterial Influx of Blood the little nervous Bodies ſwell, erecting the *Clitoris*, and tying or binding round that Membrane, ſo that the hanging nervous Nipples become more turgid, and thereby they nicely diſtinguiſh the ſmalleſt Titillations, and the Venereal Pleaſure is increas'd. The more ſalacious Females, by this Contraction of the Veſſels, and ſalſe

us Titillation of the Glandules, are wont hrow out a profuſe Quantity of Liquor, ich they commonly call Seed.

Thus much for the *Clitoris*, which upon caſion, and by reaſon of the Knowledge his Subject, ſome in Converſation will m that they know the true Signs of ginity. But from the following Account the Spermatick Veſſels, and what relate eto, it will appear from Mr. *Raw*, that *Hymen* is rarely found in grown Perſons, n the too great Curioſity of the Sex, and r untimely Lechery; ſo that it may ſeem radox, not of little Difficulty to deter- e the true *Diagnoſis* or Signs of an adult ſon, whether ſhe has bore a Child, or a Miſcarriage, from one that never had er. But there are ſeveral Women who e contracted Foldings or Wrinkles in the n of the Belly, eſpecially lean phlegma- Perſons, upon the firſt Child, although cannot come to examine ſtrictly into the r Signs of their Virginity, who can ce eſcape a juſt Suſpicion of having had ldren before by the unskilful Vulgar. that I ſhall excuſe the Artifices us'd by e wanton Ladies, by which Means they he their Bellies, and uſe other proper ns after Delivery to render the Parts nd and ſmooth; though there are other ſes than that of Conception to make the furrow'd and wrinkled, which do not nit us to cenſure them for the Loſs of ginity: For what if the Belly ſhould e wrinkled upon an *Aſcites*, Dropſy of Womb, or other the like unhappy Ef- ? Would it not be the greateſt Injury to e they were Whores without further iry? Therefore ſince a wrinkled Belly ot ſufficient to prove their having had ldren, ſo it is too trivial an Inquiry to t the contrary; there ought to be other certain *Phænomena* or Appearances to ce us to paſs a clear Judgment upon the er. Theſe Things are to be found, y from external Cauſes, and partly the internal Parts of the Women: in the Externals, we muſt inquire in- e Part call'd by the *Greek* Anatomiſts *μυρτα*, the great Fiſſure or Chink, by nſpection of which a more certain Judg- may be made of the having had Chil- : For the Aperture of this, which by Anatomiſts are call'd the Lips, that Part which lies towards the *Anus* is more ſtrict, and ſticks cloſer together, in thoſe who have not yet known a Man; ſo that the Space betwixt the Lips and the *Anus*, call'd the *Perinæum*, is broader and larger, but the Fiſſure it ſelf, eſpecially towards the Gut, ſtraiter and more united. This Strictneſs of the Bridle of the Lips, by the Paſſage of the *Fœtus* in Child-bearing, is conſiderably relax'd, and the Fiſſure it ſelf for that Reaſon towards the *Anus* not a little dilated; neither will it afterwards return to its priſtine Texture again.

As to the internal Parts; we ought to examine the Foldings of the Orifice of the *Vaginæ* or Neck of the Womb, call'd by ſome the *Carunculæ Myrtiformes* or Myrtle-berried Caruncles, which by a great many are believ'd to be the Remains of the *Hymen* after deflouring. Theſe make the ſaid Orifice of the *Vaginæ* ſtraiter by their wrinkled Foldings, and by their turgid and uneven Swelling, ſo that in theſe wicked Days, they are by moſt People taken for the *Hymen* or Virginity it ſelf: Neither is it to be imagined, that in thoſe Girls who now and then uſe a Man, the Virgin Pleaſure is altogether wanting; for if they are healthful, and of a good Conſtitution, not too phlegmatick and ſpongy, the Cloſeneſs of the Orifice, and the Swelling of the Caruncles, will be maintain'd ſufficiently entire; to take no Notice of the Arts us'd to conſtringe the Parts, and render the Paſſages ſtraiter, by the warm laſcivious Nymphs, who make it their Study to attract Men to their Venereal Embraces. But the Matter will be quite otherwiſe in thoſe who have had but one Child; for in theſe the Unevenneſs and Wrinkles of the glandulous and membranous Parts, thoſe grateful Inducements to Venery, are ſo obliterated or worn ſmooth, that there are ſcarce any Remains left of their having been otherwiſe; which has alſo been the Reaſon that thoſe Foldings or Wrinkles have been taken for Caruncles or fleſhy Swellings, which *De Graef*, that curious Inquirer into the Organs of the Fair Sex, will not allow of by any Means.

So much for the Signs of Child-bearing, which ought not to be eſteem'd a ſuperfluous Speculation, becauſe they have been found ſo difficult

difficult at all times, as well as thoſe of Virginity; as is atteſted by the Learned *Horace Eugene*, formerly Chief Phyſician to the Duke of *Savoy*, who ſays, in his firſt Epiſtle, Tome 2d, Chapter 5th, in the *Folio* Edition, printed at *Francfort* 1597. *Sex probatæ Famæ & Peritiæ Obſtetrices Juvenculam quandam judicaſſe Virginem intactam, quæ ſeptem antea Menſibus Puerum pepererat.* Six Midwives of approv'd Skill and Reputation, adjudged a young Girl to be a pure Virgin untouch'd by Man, that had brought forth a Boy ſeven Months before.

Our Anatomiſt ſpeaking concerning the *Circle* about the Nipple in the Breaſt, ſays, it is made up of the finer Part of the *Cutis*, but has a firmer and more compact Texture than any other Part of the Skin, leſt the continued Force of the Infant beating againſt the Circle in ſucking, ſhould eaſily hurt it; for we may ſee in other Parts of the Body, if we ſuck the Skin, it will inſtantly grow red. From the Deſcription of the Glands, you have as follows.

There are eight greater Glands which are found in a Humane Head, the two *Parotides*, two under the Jaws, two under the Tongue, and thoſe call'd the Almond Glands; all which are compos'd of a large Number of other Glands, whoſe diſtinct Orifices we may eaſily ſee with our Eyes. The *Parotides* empty their *Lympha* by *Steno*'s Duct into the Jaws, perforating the Trumpet Muſcle, which is round upon the Cheeks like a Circle, near the third Grinding Tooth, from the Dog Teeth of the Upper Jaw-bone.

The Glands under the Jaws, and thoſe under the Tongue, which *Placentinus* deſcribed long before *Wharton*, empty their *Lympha* by one and the ſame Duct under the Tongue, near the Bridle and Frog Veins. *Nuck* has a new Gland under the Lower Eyelid, which he aſſigns for carrying of a watry Humour in the Eyes, which being ſuppos'd to riſe from the Brain, is all Fiction and *Chimera*.

During the Time we continued our Anatomical Exerciſes, a Controverſy was maintain'd betwixt Dr. *Phil. Verheyen* of *Louvain*, and Dr. *Godfrey Bidloo* of *Leyden*, both Anatomiſts of their ſeveral Univerſities, concerning the Gland *Thymus*, which is ſeated in the Throat, for ſeparating the *Lympha* from the Blood, and emptying it by the Lymphatick Veſſels. The Arguments of the Diſpute, and the Writings upon them, each Side were publickly printed. From this Controverſy, riſes an Occaſion for us to examine this Gland more nicely, together with its Situation in a new born Child. And we found it ſticking under the Thyroid as well in the ſuperior and anterior Cavity of the Breaſt, under the *Os Sternum*, it joins to the *Mediaſtinum* (which divides the Lungs and other *Viſcera* of the *Thorax* into two Parts) by Means of a fine fatty Membrane which may be compared to that of the Caul. It touches the *Vena Cava* in its ſuperior Trunk, the whole *Aorta*, before it winds itſelf into an Angle, and Part of the Beginning of the *Pulmonary Artery*, as far as it is viſible out of the *Pericardium*. It touches lightly upon theſe Veſſels by the Interveſtion of the foreſaid Membrane, ſo that you may reach it with your Fingers. And particularly it is to be obſerv'd, contrary to the jejune Deſcription of Mr. *Bidloo*, concerning the Situation of the *Thymus*, that the upper Part of it touches the firſt Diviſion of the ſuperior Trunk of the *Vena Cava*, but not one of the three Branches from the Angle of the *Aorta*; but the lower Part of this Gland is found upon the *Pericardium*, even to the Middle of the Heart, and adheres to the *Pericardium* by Means of the foreſaid loose Membrane. The particular Uſe of this Gland is, without all doubt, for Aſſiſtance to the larger Veſſels: But when it ſwells in Infants and the *Fœtus* with a milky chylous Juice, which, after the *Fœtus* is born, ſenſibly diminiſhes, it muſt appear altogether to be deſign'd for the Nutrition of the Fœtus in the Womb; but for what Reaſon we do not yet know.

Mr. *Raw* firſt obſerv'd in his *Angyology*, the Deſcription of the Veſſels, that the great *Lienterick Branch* of the *Venæ Portæ*, which the *Pancreas* joins to it, ſends forth ſeven, eight, and ſometimes ten or more Branches according to the Length of the Duct; the Veins having inwardly membranous Productions, call'd *Valves*, two whereof always correſpond as to Height and Situation; and having that Uſe as many Authors would have them, to further the Motion of the Blood in the Veins; for this the Laws of Circulation can effect, altho'

ins be far distant from the Heart, and rce feel its Impulse. For another Reason o, we shall not assign *Valves* peculiar to the Veins, but to the *Cava* only and its anchings, that in every *Systole* of the Heart Venal Blood might at that Moment be p'd, lest too great a Weight might hinder Admission or Entrance of the Arterial ood into the Veins. Besides, we see in lower Parts the *Valves* always apposite the Orifice of the Branching Veins, that the Blood entring by those Orifices, and larger Ducts of the Veins, might be re-ved as it were by so many divided Chan-ls, lest the protruded Blood break, and errupt the light Motion of the Vital eam in the larger Veins on both Sides. t it is to be observ'd still, in the great ver Branch of the *Cava*, and the superior unk before it makes two, that there are rce any *Valves* to be found: But if there any fine subtle Membranes produced in se larger Trunks next to the Heart, they seldom able to resist the impetuous Mo-n of the Blood from the *Systole* of the art; for which Reason they are rather nd in those Vessels wherein the *Impetus* Force is sensibly remitted. On the con-ry, the *Vena Porta* ought to have no *Valves*, reason that Pressure in the *Systole* of the rt cannot be exercis'd in the Blood of the *ta*; for the upper Part of the *Portæ* does Duty of an Artery, by receiving the od into its inward Part, and distributing through the Liver. Hence it has rather Texture and Make of an Artery than a n.

What I have observ'd in the opening of d Bodies, as to the Situation of the Parts general, and their Connexion, I shall com-nicate to you in short. Upon the cutting n the Belly, as it is known, the Guts ap-r first in View, which are so dispos'd in ir natural Situation, that the *Jejunum* or ngry Gut fills the Region above the Na-but the *Ileum* that below the Navel; so t these took up the greatest Part of the vity of the *Pelvis* or Bottom of the Belly. *Colon* lay hid in the lower Part, and in ooked Sigmoide Figure from the right llow of the *Ileum*, just to the *Intestinum um* or strait Gut. The *Duodenum* lay ied in the left Side under the *Jejunum*. The Liver occupied the whole Breadth of the upper Part of the *Abdomen* under the *Diaphragm*, so that a much greater Part lay on the right Side than on the left, because there must be some Room left for the *Spleen*; but the *Stomach* seems to be almost entirely hid under the *Liver*, and is fasten'd to the *Spleen* by the *Vas Breve*. Over these the *Omentum* or *Caul* extends it self, which is not perforate any where, but adheres to the *Colon* with two Folds, and is fasten'd other-wise singly to the *Stomach*, the *Spleen*, and the *Duodenum*. The *Urinary Bladder* to the Inside is only united by Fat, but on the other Side lies in the *Hypogastria* or lower Cavity, that the Stone might be cut from thence with less Trouble and Difficulty; but because of the Fat, the Bladder wounded in these Parts can never knit or heal again with the *Peritonæum*, but the Urine must fall into the Cavity of the *Abdomen* with deadly Danger. The *Intestinum Rectum*, particularly its *Sphincter*, appears to be entirely buried in Fat, which is not only of extraordinary Use in expelling the hard *Fæces*, but is eminently serviceable in a difficult Labour, to wit, that it might yield or give Way to the Birth, which can scarce be done, if the carnous Fibres of the Muscles of the Neck of the Womb lie adjacent or next to them. On the other Hand, this Fat in a preternatural State contributes much to the Generation of *Fistula's* in the *Anus*.

In opening the *Thorax* or *Chest*, the first Thing that comes in View is the *Mediastinum* or Partition, which is nothing else but a Doubling or Continuation of the Membrane of the *Pleura*, and make two Bags on both Sides; from whence it is plain, from what Reason a particular Dropsy may attend this Part, which *Hippocrates* takes Notice of. The eighth Pair of Nerves or *Par Vagum* is dilated through the Neck into the Breast, and being held up by the Parts adjacent, falls into the *Pericardium*, *Lungs*, *&c.* but the *Intercostal Branch* is presently fix'd to the *Vertebræ* of the Back.

In the anatomizing of a young Man of about 16 Years of Age, Mr. *Raw* demonstrated the following Things to us; *viz.* the *Seminal Vesicles*, the *Vasa Deferentia*, and the Veins of the Testicles. The Seminal Vesicles are firmly united to the *Urinary Bladder*

about the *Sphincter*, and the *Sphincter* ſeems to contribute to the Excretion of the Seed in Coition, altho' thoſe Veſicles have muſculous and carnous Fibres, which firſt of all irritate them.

The *Vaſa Deferentia*, as to the outward Appearance of their *Veſicles*, are placed among the *Ureters*, which are expreſs'd by the Figure X. contrary to the Anatomical Obſervations of *Lealis* in the Works of the Learned, printed at *Leipſick* in the Year 1687, *pag.* 229. where he takes Notice, that the *Vaſa Deferentia* terminate not in one common Duct, but in two plainly diſtinct ones cloſe united with each other, adjoining to the *Urethra*, which he demonſtrated to the Eye by blowing them up with a Pipe. The ſame Author has ill deſcrib'd the *Vaſa Deferentia* where they are ſo diſpos'd as to form the *Epididymis* of the Stones, which are winding Veſſels, that may be eaſily ſeparated with the Fingers; but on the other Hand, by the frequent occurring of the *Anaſtomoſis*, we may ſee them in the prepared Veſſels when fill'd with Wax.

Thoſe who deny the returning Veins from the Teſticles are fooliſh; for by Injection with red Wax, they may be demonſtrated to the Eye in a ſufficient Quantity and Number; from which Experiment, we may clearly diſcern the Veins which are for the Nutrition of the *Vaſæ Deferentia*. The Subſtance of the Stones is compos'd of meer Capillary Veſſels, which Veſſels are ſuſtain'd by the Membranes from the *Albuginea*, or that Skin which immediately contains the Teſticle; as for Example, we ſee the *Pia Mater* made in the Brain; for thoſe Extremities of the Capillary Veſſels are not only from Veins and Arteries, but likewiſe from the *Vaſa Deferentia*. Theſe Veſſels are upheld by the Form of the *Albugineæ*, leſt they ſhould be ſqueez'd or diſturb'd, and ſo the Separation of the Seed is made.

If one Teſticle only appears in a Man, the other oftentimes is hid in the *Abdomen* or Belly, and by ſome unskilful Surgeons ſometimes is taken for a *Bubonocele* or Rupture when the Inteſtines fall into the *Groin*. The internal Membrane of the *Urethra* is the Production of the internal Membrane of the tendinous Part of the Bladder, and ſo the Reins have a *Gland* inſtead of a Skin. Hence comes the greateſt Pain after cutting for the Stone, by Means of the Conſent of the *Glans* of the Yard.

Mr. *Raw* compares the *Vaſa Deferentia* and *Seminal Veſicles* with the *Hepatick Duct* and *Gall Bladder*; for as we ſee all the ſuperabounding Bile or Gall excern'd out of the Hepatick Duct return'd into the Gall Bladder, ſo in like Manner all the Seed that is brought from the *Vaſa Deferentia* regurgitates or flows back into the *Veſicles*, and then at laſt from thoſe two *Veſicles* by their diſtinct Canals is caſt into the *Urethra* in the Act of Venereal Coition.

Among the Preparations of Women's Organs, he obſerv'd to us the following Particulars concerning the *Sinus* of Women obſerv'd by the Ancients. The Knowledge of this *Sinus*, (which is obſerv'd after the Caruncles call'd the *Myrtiformes*, and in the Neck of the Womb under the *Os Pubis*, and in thoſe who have only bore one Child will eaſily admit of ones Fiſt) is of great Uſe in the Delivery of the Birth; for then the Hand of the Surgeon or Midwife, except applied betwixt the prominent Parts of the Infant, and this *Sinus* which is under the *Os Pubis*, is of no Uſe; for the Space here affords ſufficient Room for the turning of the Hand, giving Way in the mean time for the Parts of the *Fœtus* preſſing to the Birth upon the *Os Coccyx* or Rump-bone.

After a difficult Delivery, and the Uſe of the Hook to draw away the Child, a deadly *Hæmorrhage* or Flux of Blood often ſucceeds; and indeed from this Cauſe, becauſe the *After-birth* being ſeparated from the dead Child in the Womb, by reaſon of the Subſtance of the *After-birth* remaining behind, cannot cloſe its Orifice as it ought to do; for by ſuch Conſtruction, otherwiſe theſe Mouths of thoſe Veſſels which diſcharge Blood would be ſhut up.

The Firſt of *March*, I, who am the Author of this Relation, and one Mr. *Wickham* an *Engliſhman*, made an Experiment of the Aperture or *Hiatus* of the *Tympanum* or Drum of the Ear, which was invented by *Rivinus* Profeſſor at *Leipſick*, by emitting Quickſilver thro' *Euſtachius*'s Tube, which immediately flow'd by the Drum of the Ear out at the Auditory Paſſage; but the Place where it particularly iſſued out we could not diſtin-
gui-

uiſh. Mr. *Raw*, who was preſent at the xperiment, thought that the *Mercury* ork'd it ſelf thro' the Pores of the Mem- ane by Means of its Weight, as we may e it do thro' Leather, *&c.* and he told us, had ſeen ſuch a Percolation of *Mercury*, ro' the Membranes of the Urinary Bladder ſelf. This Experiment of ours was made on the dead Body of a young Fellow of out Sixteen Years of Age.

The following Chirurgical Operations I w perform'd upon live Subjects at *Amſter- m*, partly, by the never too much to be mmended and celebrated Surgeon Mr. *Raw*, rtly by Mr. *Peter Adrianſen* and Mr. *Boeck- ann* eminent Surgeons of the ſame Place.

The Twenty firſt of *January* 1707. there me a Boy to Mr. *Raw*, from a Village l'd *Cromenic*, of about Sixteen Years old, th an Incontinence of Urine, and la- uring under grievous Pains in the *Hypo- trick Region*; theſe were Signs of a Stone, which, that our Maſter might be ſure, examined him after the following Man- : Laying the Boy upon the Ground on Back, he ſupported his *Yard* upright h ſoft Rags, and thruſt his crooked *Ca- er* which he us'd for that Purpoſe into *Urethra*, firſt moiſtening it with Oil; he put the crooked Part of the *Catheter*, up towards the *Perinæum* or *Anus*, juſt he came to the *Os Pubis*, which then he n'd upwards, and then penetrated into Bladder. He then gave us ſufficient owledge how to manage the *Catheter*, and over whether there was a Stone; which enſibly underſtood from the Motion of *Catheter*, that in this Subject there was a e ſufficiently large to cut; and accord- y he determin'd to make a Section the *rch* following, becauſe he was willing ave the Cold of the Winter paſt; but he Interim, he adviſ'd the Patient to k warm Milk conſtantly, inſtead of his nary Drink. The Cauſe why this g Fellow could not hold his Water, from the Size of the Stone continually ng on the Neck of his Bladder, ſo that Contraction of the Bladder never cea- and conſequently a voluntary Emiſſion follow. I was not willing to paſs his Examination of the Stone, know- t is not a little Commendable for a Surgeon to be dextrous in Searching for and diſcovering the Stone, neither are all ſo de- licate in the Management of their *Catheter*.

The Seventeenth Day of *February*, 1707. I, and Mr. *Wickham* aforeſaid, went with our Maſter *Raw* to *Cromenic*, a Village near *Harlem*, where the Boy was to be cut; which was done in the Preſence of Two Surgeons and Burghers of the ſaid Town. After the Body was diſpos'd in a proper Po- ſture with the Arms bound, and the Po- ſteriors laid higher than the Head, and the Feet ſo tied, that the Part to be cut cou'd not be moved: Mr. *Raw* kneeling with one Knee upon the Table, ſets himſelf directly before the Patient, thruſting in a common *Catheter* moiſten'd with Oil into the Yard, at laſt meeting with the Stone, he with- draws that and puts in another *Catheter*, ſo deep that he might feel it upon the *Perinæum* with his Fingers, then he makes an Inciſion in the Left-ſide of the *Perinæum*, Four Fin- gers breadth from the Tuberoſity of the *Os Iſchium* or Huckle Bone, and a Fingers breadth from the *Anus*, which Place of In- ciſion the *Catheter* depreſſes towards the *Peri- næum*. His Inciſion-Knife was guarded a Thumbs breadth, looking like a common Launcet, which was not laid above the Length of the firſt Joint of the Finger. Firſt, He cut the Skin, and then making an Inciſion thro' the Fat and the Muſcles, he applied his Itinerary; after which he pene- trated the Neck of the Bladder, then put- ting in the Pen-knife to the Wound, hold- ing it ſtrongly with his Hand, he deliver'd it to me, but in the mean Time ſnatch'd up his *Forceps* and drawing out his Pen-knife, he thruſt it in betwixt the Itinerary and Conductor, dilating the Lips of the Wound by thoſe Two ſaid Inſtruments, by which Means he happily drew out the Stone; when it was extracted, it was the Size of a little Hens Egg, moiſten'd with Blood, and on one Side ſurrounded with a ſmall little Membrane, where perhaps it had an Adhe- ſion to the Side of the Bladder: It was al- moſt of a round Figure, and uneven like a large Sand or gritty Stone. Cleanſing the Wound with a Sponge, he applied nothing but a little Lint, and ſo binding up the Pa- tient he put him to Bed, placing under his Buttocks ſome Oatmeal to receive the Urine,

that wou'd run from the Wound and Fæces upon Occaſion. He order'd the Curtains of the Bed to be drawn cloſe, that the Light might not diſturb the Patient's Reſt, to compoſe whom, he order'd an Anodine Emulſion to be drunk, *ad libitum*. After the Operation, and the Sick being juſt laid on the Bed, he cried out of exquiſite Pains in the *Glans* of the Yard, when the Stone was taken away, which happens by Conſent; in all which the Membrane of the *Urethra* has with the inward Membrane of the Bladder.

On the Seventh of *March*, I ſaw another *Lithotomy* or Operation for the Stone perform'd by my Maſter on a *Jewiſh* Boy of Seven Years old, in which, beſide what I have already told you, nothing particular happen'd, except the falling down of the *Inteſtinum Rectum*, occaſion'd by the Cries of the Patient, which lubricating with Oil, he put up again with his Finger, leſt it ſhou'd hinder him in his Operation.

The 21ſt of *Febr.* A Boy of Eight Years old labouring under an *Hydrocele* was brought to Mr. *Raw*, who making a Perforation by an Inſtrument call'd a *Trocar* into the *Scrotum*, freed him in half an Hour's Time by letting out the Water. In this Operation theſe Things are to be obſerv'd: 1*ſt*. That we touch not the Veins in this Perforation. 2*ly*. That the Needle or Point of the Inſtrument be applied to the Tranſparent Place, and that you pierce no deeper than you find it clear. 3*ly*. After the Operation is over, that you apply a Plaiſter of *Cummin*, or the like, over the whole Cod. Alſo it is to be noted, that in an *Hydrocele*, the *Vaſa Preparantia* and *Deferentia* may be diſtinguiſh'd by the Fingers: In the *Hernia* the contrary, for they ſeem to be confus'd by the falling of the Guts. Which may ſerve for a Diagnoſtick Sign, whereby to know the preſent Condition of any Patient.

The 22d of *Febr.* Mr. *Raw* viſited a Mechanick, who knew nicely how to make the beſt Anatomical and Chirurgical Inſtruments. He labour'd under a *Caries* of the Shin-bone in the upper Part, in which Place Mr. *Raw* made an Inciſion, and directed his Kniſe to the very Bone; having made the Inciſion, he ſeparated the proud Luxuriant Fleſh from the Lips of the Wound, which he dilated, that there might be more Room for applying the Cautery. The Bone being infected with the *Caries*, the carnous Fibres of the Muſcles were eat away in the carious Part, and cou'd never be brought upon the Bone again, till the *Caries* was taken away. At laſt the Cauteries were applied, that the Veſſels which ſupplied the *Caries* upon the Bone might be extirpated, which being done, the carious Part ſeparated for a Time, and at laſt healed; for the *Carious* Part of the Bone being taken away, the carnous Fibres happily grew again, and at length conſolidated with the Bone.

There was an Infant of Six Months old, whoſe Face was deform'd with a double Hair-Lip; which the Manual Operator ſeparated with his Kniſe from the Gums of the upper Jaw-bone, to which they were tied: This being done, there were Three Silver Needles prepared, one Three-corner'd, another Round, and a Third Broad of Three Fingers Length; with the Firſt, they ſew up the gaping Fiſſure of the Lip; the ſecond Needle is put thro' the lower Part of the Fiſſure, binding cloſe the Lips of the Wound as the former does; but the Third Needle is applied in the middle Part of the Fiſſure. Theſe being accurately us'd to the Part by help of the *Forceps*, in the laſt Place, a Plaiſter is to be put upon the Two Extremities of the wounded Part: And after the Operation, a comfortable Draught is to be given to the Infant.

Amputation of Members.

IN the Amputation of the Foot, the Extremity of it ought to be plac'd higher than the upper Part, that it may hinder the Blood from ruſhing too forcibly on the Part cut: Then it may be ſtop'd by Application of the Chirurgical Inſtrument call'd the *Taarniquet*, ſo that a Spoonful of Blood ſhall not be loſt. The *Amputation* being perform'd in a fleſhy Part, is ſooner done than in a Bony, where the Saw is forc'd to be us'd, otherwiſe the Bone might be much eaſier broken. When the Work is over, you muſt not bind the Part up with Oils or Plaiſters, nor tie up the Arteries by the *Forceps*, but 'tis ſufficient to apply Aſtrin-

gent

nt Powders with a Bladder, and fenc'd th Plaiſters. But take Care you uſe no *riolick Aſtringents:* Neither make your gature too ſtrong in Children and lean ople, for fear of a Gangrene, but in groſs Bodies it may be ſtricter made.

Such Excreſcencies are the beſt taken off a Ligature, which is done with a ſtrong ce of Silk, wrap'd Two or Three Times und the Excreſcence, and tied hard with a ce of Lead or Iron at the End of it; ſo it ll fall off in Three or Four Days: The ht Inflammation that may ariſe from the gature, is not to be regarded. This Opeion was done by Mr. *Boecklemann*, the th of *Dec.* 1706. in a Woman of Eighty ars of Age with extraordinary Succeſs.

Mr. *Bidloo* of *Leyden* was call'd to a Woan at *Amſterdam*, labouring under a *Scirs* of her right Breaſt: But his Opinion s, that this *Scirrhus* was a *Cancer*, and erefore prepar'd to cut it off; but r. *Ruyſch* being call'd to Conſult with n before the Operation, affirm'd it was no *ncer*, but only a *Scirrhus*, and applying a iſter of *Cummin* to it, in Four Days diers'd the Tumour, and made a happy re of it. In a true *Cancer* the Matter her lies hid, or is exulcerated, and r. *Ruyſch* thinks it the beſt Method not to itate it, much leſs apply hot diſcuſſing edicaments to excite the Acrimony: The ſafeſt Medicines are the cooling, as the Emplaiſter of Frogs with *Mercury*, or Plates of *Lead* dipt in *Quick-ſilver*.

Before all Things, the falling down of the Guts are to be reſtor'd or put up with the Fingers, or a certain obtuſe round Inſtrument, they may be thruſt up by Error betwixt the *Peritonæum* and the Muſcles of the *Abdomen*, which often happens; for the *Peritonæum* is much eaſier divided from the Muſcles of the Belly in live Perſons, than in dead Bodies: So that if the Guts, as ſaid before, be thruſt betwixt the Muſcles and *Peritonæum* it is Mortal, for a Gangrene preſently follows: The ſame Thing happens when the Guts being down, are too much handled and ſqueez'd.

Theſe Bones are reſtor'd by Means of an Iron or Wood Inſtrument, form'd ſo that it can anſwer to the Inſide of the Noſe: This being cautiouſly put up by Degrees into the Noſtrils, raiſes up the depreſs'd Bones: Outwardly it ought to be aſſiſted by the Hand, till what is wanting be perfectly reſtored. This being done, one or two little Pipes, as Neceſſity requires, ought to be put up the Noſtrils, which Pipes ſhould be made with Two Auricles perforated, thro' whoſe Holes a String being put, might be tied above. Outwardly apply a Defenſative Plaiſter of *Vigo*, which may be tied to the Part by the Neck.

---

f the Manner and Laws of Secretion, the true Struture of the Glands, and of the Operation of Vomitive, Purgative and Mercurial Medicines, which are Mechanically explain'd. By Dr. Chene.

THAT the whole Body is nothing but a Congeries of Canals, the greateſt (at leaſt a conſiderable) Part of which is *nds* properly ſo called, deſign'd for the aration of ſome Fluid.

This is evident, when any Part of the dy is ſwell'd, ſo that the Inconſpicuous ones become viſible; and has been clearly demonſtrated by *Malpighius*, *Leuwenhoeck* and others.

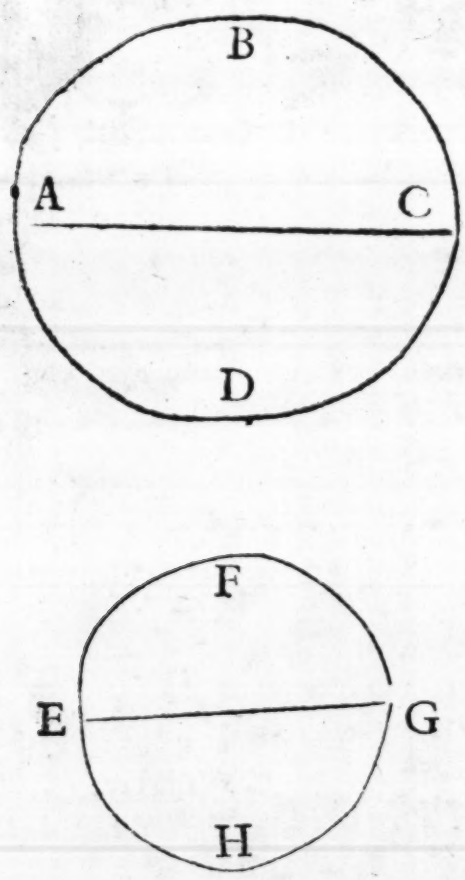
2. That when a Machine is diſordered, if we ſhould ſee it righted by adjuſting ſuch a particular Part, we might without Scruple affirm, that it was ſome Injury done to that Part, which had diſorder'd the Machine; eſpecially.

eſpecially, if after the Whole was taken to Pieces, we ſhould find them all ſound, ſave that particular One.

Thus, if we ſhould ſee a Watch-maker, by adjuſting only the Ballance of a Watch, make her go right; we might ſay, the Diſtortion of the Ax thereof had occaſion'd her going wrong, eſpecially if all the other Parts be found as they ſhould be.

LEMMA I.

LET there be a greater Diſtractile Cylindrical Canal, whoſe Orifice is A B C D, through which a given Quantity of Liquor paſſes in a given Time; and a leſſer One E F G H, through which a proportional



Quantity of the ſame Liquor paſſes with the ſame Celerity as in the former: Let now the greater A B C D be encreas'd or diminiſh'd by the leſſer E F G H, ſo as that in the encreaſed or diminiſhed Cylindrical Canals the ſame Quantities only paſs, which paſs'd in the ſame Time in the firſt ſuppoſed Canal A B C D: To find the Quantity of the ſame Fluid, which will diſtract, (and produce the other Effects of encreaſing the Quantity of the paſſing Fluid, and conſequently its Celerity, the Canal, (by encreaſing its Diameter) firſt ſuppos'd A B C D after the ſame Manner, only that the encreas'd (A B C D + E F G H) or diminiſh'd (A B C D - E F G H) Canals are now diſtracted.

Let the Quantity, which in the firſt Suppoſition paſſes through the Canal A B C D be call'd a, and the Quantity which paſſes through the Canal E F G H be call'd b: Since in the firſt Suppoſition the Celerities are the ſame in both, their Orifices will be as a and b reſpectively. Likewiſe the encreas'd and diminiſh'd Canals (ſeeing their Altitude is ſuppos'd the ſame) will be as their Orifices $a + b$, and $a - b$; and the Quantities paſſing through them in the ſame Time, with the ſame Celerity, would be likewiſe as $a + b$ and $a - b$: But (in the ſecond Suppoſition) the ſame Quantity is ſuppos'd to paſs in the encreas'd Canal ($a + b$) and diminiſh'd one ($a - b$) which paſs'd in the firſt ſuppos'd Canal A B C D, or a, therefore now the Quantities paſſing through the Canals, encreaſed or diminiſhed, will be as a; wherefore, as $a \pm b$, (the Quantity paſſing through the encreas'd or diminiſh'd Canals in the firſt Suppoſition) is to a; (the Quantity paſſing through them in the ſecond Suppoſition) ſo is (the Quantity paſſing through the leſſer Canal E F G H, in the firſt Suppoſition) to $\frac{ab}{a \pm b}$, the Proportional Quantity which paſſes through, and will diſtract the leſſer Canal E F G H, after the ſame Manner that the encreas'd or diminiſh'd Canals are diſtracted in the ſecond Poſition. Adding or Subſtracting this Quantity from a, (which as the Quantity paſſing through, or diſtracting the encreas'd or diminiſh'd Canals) the Sum or Difference $a \pm \frac{ab}{a \pm b} = \frac{a^2}{a \pm b}$ will be as the Quantity which will diſtract the firſt ſuppos'd Canal A B C D after the ſame Manner, *&c. q. e. i.*

SCHO

SCHOLIUM.

HE whole Canals of the Body, (ſave the Inteſtines and Lacteals) may be conred as a concave Cylinder, whoſe Baſe he Orifice of the Aorta, as its Exit from Heart; and whoſe Length is a mean thmetick Proportional betwixt the longand ſhorteſt Artery, (I mean the whole gth of the Artery, till it degenerate into ein; for the Length of the Veins are of Conſideration here) it being their ſplit- into Branches which makes them not indrical. Now, by *Poſtul.* 1. the Veſwhich make up the *Glands* may have Proportion of Minority to the whole e Canals; ſuppoſing then an Obſtrun or Dilatation of the *Glandular* Veſſels, vident the foreſaid concave Cylinder be thereby diminiſh'd or encreas'd in given Proportion: Suppoſe, *e. g.* the meter of the Cylinder ſo obſtructed is to of the whole, as 1 is to the $\sqrt{2}$; Orifices will be as 1 to 2. Suppoſe , there are twenty Pounds of Blood in n, ſeeing at the Beginning of the Ar- Veſſels (which conſtitute the Glands) Velocity is near the ſame, as proceeding the ſame Cauſe, the Compreſſion of Heart: Therefore divide 20 into two , which may be (in this Caſe) as 1 2, (which done by this general Rule $\frac{md}{m+n}$, $y = \frac{nd}{m+n}$ putting d for the ounds, x for the greater, and y for eſs proportional Part, m to n their) the Parts will be here $6\frac{2}{3}$, and which are the proportional Parts of ounds of Blood, which would natupaſs in the obſtructed Canal, and in emainder whereof, which is paſſable. f all the 20 Pounds muſt now paſs in aſſable Canals, then it ſhall be diſtractmuch as if the whole Canals were le; but that 30 Pounds of Blood were through it in the ſame Time, by the ling Lemma. For in this Caſe, $a = 20$, $6\frac{2}{3}$, $a - b = 13\frac{1}{3}$, and therefore $\frac{aa}{a-b} = 30$. If the Orifices were as 1 to 3. then $b = 5$, $a - b = 15$, and $\frac{aa}{a-b} = 26\frac{2}{3}$, this ſuppoſing an Obſtruction. If there be a Dilatation ſuppos'd in the ſame Proportions, then $\frac{aa}{a+b}$ will be in the firſt Caſe 15, in the ſecond 16. The ſame may be applied to the *Liquidum Nervorum*, which paſſes in the Nervous Canals: For the *Gland* conſiſts of a complicated *Nerve* as well as *Artery*, and in an Obſtruction or Dilatation of the ſame, both *Artery* and *Nerve* are ſuppos'd to be obſtructed or dilated.

The Deſign of all this is to ſhew, that in an Obſtruction or Dilatation of the Veſſels, it is the ſame Thing as if the Liquors therein contained were augmented or diminiſhed in a certain Propoſition; as in the Caſe of the Blood-veſſels, ſuppoſing 20 Pounds of Blood (which is the ordinary Quantity) in a Man; and ſuppoſing one half of the whole (by an Obſtruction in any Place of the ſaid) Veſſels were rendred impaſſable; it is the ſame Thing *quam proxime*, as if the whole Blood-Veſſels were paſſable, but that one half more of Blood were forced through them in the ſame Time, in which the 20 Pounds paſſed. Of the ſame Nature is

LEMMA II.

THE Blood being ſo corrupted, that the Strength is impar'd or encreas'd, it is the ſame Thing as if it were in its natural Eſtate, but that the Quantity thereof were diminiſh'd or encreas'd in ſuch a Proportion as is neceſſary for producing this Encreaſe or Decreaſe of Strength.

This is the 49th Prop. of *Bellini*'s Book *De Motu Cordis, &c.* and its Converſe: The Propoſition it ſelf is there demonſtrated, and its Converſe may be demonſtrated after the ſame Manner exactly.

What is here ſaid of encreaſing or diminiſhing the Strength, is likewiſe true of all the neceſſary Effects of leſſening or encreaſing the Quantity of the Blood. Theſe Things premis'd, I come to

The General Propoſition.

THE General and moſt Effectual Cauſe of all Fevers is the Obſtruction or Dilatation of (the complicated *Nerve* and *Artery, the Excretory Duſt and Conſervatory*, one, or rather all theſe; which, as ſhall be afterward ſhewn, make up) the *Glands*, and they receive their Denomination as theſe, or thoſe *Glands* are more or leſs obſtructed or dilated.

Other Things may concur, but theſe are the moſt powerful Cauſes.

It were a Work of more Time and Pains than I can at preſent beſtow, to apply this Propoſition to all particular Kinds of *Fevers*, tho' I am ſufficiently ſatisfied it will account for all. I ſhall here only (as an Earneſt of the reſt) ſhow how to apply it to continu'd *Fevers*, and therefore contract the General into

The Particular Propoſition.

THE moſt effectual Cauſe of continu'd *Fevers* is an Obſtruction of the *Glands*, which will neceſſarily augment the Quantity of the Blood, and *Liquidum Nervorum*, in the paſſable Canals, and perhaps (by the Stagnation of the Fluids contain'd in theſe) ſo vitiate their Nature, as that they may be juſtly reckon'd to concur as a partial Cauſe of theſe *Fevers:* But I rely moſt on the Firſt, to wit, the Augmentation of theſe Fluids. For a Demonſtration of this, I ſhall firſt ſhew how it accounts for all the Appearances of ſuch *Fevers*, and then ſubjoin ſeveral Arguments to confirm the ſame.

Suppoſing the Glands obſtructed the Quantity of the Blood in the Arteries, and the *Liquidum Nervorum* in the Nerves may thereby be ſuppos'd augmented in any given Proportion of Minority to the whole Maſs of theſe Liquors, *per Lemm.* 1. and its *Scholium.* Wherefore it will hence follow,

§. 1. That the Pulſes muſt be ſtronger and more frequent than ordinary upon theſe Accounts; 1. Seeing there is a greater Quantity (than ordinary) of Blood in the Arteries, the lateral Preſſion will be ſtronger; and ſeeing the Arteries are diſtractile, they will be driven outward with greater Force, and make a ſtronger *Ictus* upon any Thing applied to them. 2. Seeing the Quantity of the Blood is augmented, *i. e.* the Quantity of the Matter whence the *Liquidum Nervorum* is generated, there muſt be a greater Plenty thereof (*per poſter. Part. Lemm.* 2.) generated, and conſequently it will flow more plentifully and more quickly into the Heart, and make it contract oftner and more violently. 3. By the Obſtruction of the Gland, the Influx of the *Liquidum Nervorum* thereinto is likewiſe obſtructed, and therefore (*per Lemm.*) there will be a greater Quantity thereof left to flow in the paſſable Nerves, and it will flow *qua data porta.* 4. Laſtly, The Arteries on every Side running upon and touching the Medullar Subſtance and Fibres of the Brain, will (they being more than ordinarily diſtended) preſs them more than ordinarily, and make a more powerful and plentiful Derivation of the *Liquidum Nervorum* into the Places whither it can flow.

§. 2. From the ſame Cauſe the Inequality or Interruption of the Pulſes is evident; for if the aforeſaid Preſſion upon the Nervous Fibres of the Brain be ſo ſtrong that it totally or partly occludes the Paſſage of the *Liquidum Nervorum*, there muſt be a Stop to the Derivation till there be ſuch a Quantity thereof collected as ſhall be ſufficient to over-power the *Impedimentum* occaſioned by this Preſſion, and ſo make an Inequality or Stop in the Contraction of the Heart. Moreover, when the Blood flows in ſuch Plenty and with ſuch Violence from the Auricles into the Ventricles of the Heart, it muſt force its Way before the Ventricle be intirely contracted, and thereby cauſe an Irregularity in the Pulſe. Add to theſe what may proceed from the Thickneſs of the Blood (it being contracted into a leſs Space) and the Evaporation of its Humidity, all theſe, either ſingly or compounded, will account for the Irregularities of the Pulſes, which have hitherto been obſerved.

§. 3. Great Pains in the Head moſt often from the violent Diſtractions of the tender Veſſels of the Brain, and from the great Preſſure of the extended Arteries upon the Fibres and Membranes thereof, all the Canals of every Kind being bowld'ned

eir reſpective Liquors, and that being the olt ſenſible Place.

§. 4. A violent and burning Heat muſt felt upon theſe Accounts; 1. Becauſe re is a greater Quantity than ordinary nning in the paſſable Canals, there muſt a greater Motion than ordinary, and conuently a greater Heat. 2. Meerly upon Account of the increaſed Quantity ithout conſidering the thereby produ- greater Velocity) there muſt be felt a ater Heat: For ſuppoſing the Heat in h ſingle Particle to be the ſame as before, ſince the Particles are more numerous in ſame Place, the Heat muſt be greater re too, as in Rays contracted by a *Concave culum.* 3. The Glands being obſtructed, the Paſſages of Perſpiration, the natural t muſt thereby be kept in, and conſently the whole augmented *per Lemm.* 1. nce proceeds our unquenchable Thirſt, Humidity, (*i. e.* the thineſt Parts) being re ready to evaporate, (ſince now the ordary Paſſages are obſtructed,) the reſt muſt roportionally drier.

. 5. The Difficulty and Frequency of piration, and the Violence of Expira- s, is hence eaſily accounted for; the ntity of Blood being augmented, there t a proportional greater Quantity there- e derived into the Arteries of the Lungs, ſince every one of the little Veſicles of *Bronchi* lie betwixt Two Arteries thus in- d, it will be harder to explicate theſe cies; and therefore one in ſuch a State naturally, with all his Force, endea- r to ſuck in the Air, which will be for- out again both by theſe inflated Arteries, by the Force of the Muſcles of the Breaſt, hragm, and Lungs, which is vaſtly aug- ted both by the greater Quantity of d, and of the *Liquidum Nervorum*, and more plentiful Derivation; as has been n in §. 1. about the Frequency and ngth of the Pulſes.

6. The Tongue is rough and diſcolour'd; uſe by the violent Motion of the Blood, the Obſtruction of the common Paſſa- he Humidity is evaporated, and the exdinary Heat ſtiffens the Fibres thereof; t's evident that only Heat and Drineſs lour the Tongue. *Vide* §. 4.

7. Want of Sleep muſt follow both; becauſe there is ſuch Plenty of Blood, and conſequently of the *Liquidum Nervorum*, (as is ſhewn in §. 1.) that there is no Need of Sleep to generate more, which is one principal Uſe thereof; and becauſe of divers Diſorders of the Head (accounted for in §. 3.) which will not allow that Tranquility which is neceſſary to bring it on, but moſt of all becauſe (by the Plenty of the *Liquidum Nervorum*) all the Muſcles, both involuntary and voluntary, (eſpecially thoſe who want Antagoniſts) are in continual violent Motions which muſt neceſſarily hinder Sleep.

§. 8. Ravings proceed from the Diſorders in the Head, accounted for in §. 3. The Nerves being diſtracted by the Abundance of their Liquor, the Heat and Drineſs of their Parts cannot perform theſe Reciprocations which are neceſſary in ſound Perſons.

§. 9. The Clear and Flame-colour'd Urine proceeds from the Velocity of the Blood, which ſeparates thereby only the thineſt of the mix'd Fluid; as ſhall be ſhewn when we come to ſpeak about Secretion.

§. 10. The vaſt Increaſe of Strength in Perſons labouring under high Fevers is evident from *Lemm.* 2.

§. 11. *Laſtly*, The Ceaſing and Diſſolution of Fevers by Purging, Sweating, Vomiting, and Abſceſſes, is wonderfully accounted for from this Theory; for if they go off by the Strength of Nature, then ſeeing the greater Quantity and Velocity of the Blood produce a greater *Momentum* by the frequent Concuſſions and Force of this, the Obſtructions are ſhatter'd and waſh'd away, till the laſt Strokes carry away all together, and thereby go off in theſe or thoſe, according as theſe or thoſe Glands were moſt obſtructed. This will be better underſtood when we come to ſpeak of *Mercurial Medicines.* If by the Aſſiſtance of Medicines, then the Medicines muſt be ſuch as are moſt proper for removing theſe Obſtructions, as ſhall be afterwards ſhewn.

1. Thus I think I have accounted for all the Appearances of continued Fevers, which I reckon one conſiderable Argument for our Theory.

2. All we ſee done in the Diſſolution or Ceaſing of ſuch Fevers is, the Opening the Glands, the driving out the ſtagnated Fluids

therein contained, which (*per Poſtul.* 2.) is another Argument. And indeed, one would hardly keep himſelf from thinking, if the removing theſe Obſtructions removed the Diſeaſe, then the putting them cauſed it: *Quo poſito ponitur, & quo ſublato tollitur.*

3. All that is obſervable upon opening Perſons cut off by Fevers, is (the reſt being ſound and entire) an extraordinary Swelling and Lividity in the internal Glands, particularly of the Lungs, the Liver, the Spleen, and the Meſentery; as has been obſerved by *Borelli* and others: *Vide Borelli de Motu Animal. Part* 2. *Prop.* 227. This is one occular Demonſtration of our Theory; and if the other Glands were as conſpicuous, I doubt not we ſhould ſee the ſame in them.

4. A Fourth Argument for our Theory is from what Dr. *Pitcairne* has demonſtrated in his Treatiſe of the *Cure of Fevers:* For ſince in Fevers the Glands are obſtructed, *i. e.* the Conduits of inſenſible Perſpiration, then by removing this Obſtruction, *i. e.* by increaſing the inſenſible Perſpiration, Fevers will be more probably cured than by increaſing all the ſenſible Evacutions; and that in the Proportion the Number of the Glands of the whole Body has to the Number of the Glands of the *Primæ vitæ*, or as the whole outward and inward Surfaces have to the Surfaces of the *Primæ viæ proximè.*

5. A Fifth Argument is from what *Bellini* has demonſtrated in his third and laſt *Propoſition* in his Section, *De Febribus:* He there ſhews, continued Fevers may ariſe from a Vitiation in the Quantity, Quality, or Motion, of the Blood from all or either of theſe. Moreover, from an Increaſe or Diminution of the Quantity of the Blood, there will neceſſarily ariſe an Augmentation or Diminution of its Velocity. The Motion depends upon the Quantity multiplied into the Velocity, and the Quality ariſes (for the moſt Part) from a Combination, or the neceſſary Effects of theſe. Hence you ſee, all that neceſſarily follows upon the whole Three may be accounted for from the firſt of theſe, to wit, the Increaſe or Diminution of the Quantity of the Blood.

6. Amputations, Wounds, Fractures, and the like, wonderfully confirm this Doctrine: For there a conſiderable Number of the Blood-Veſſels are ſtopp'd, and cannot make their Circle, and conſequently increaſe the Quantity of Blood in the reſt, ſo that generally Fevers enſue, if the Quantity be not leſſened by letting. It is true, the violent Pain may occur, ſince all Pains is a *Stimulus*, and all Stimulations occaſion a more plentiful Derivation of the *Liquidum Nervorum*; but if the Quantity of Blood be not ſuppos'd augmented, that Liquor muſt neceſſarily fail in a ſhort Time.

7. We may ſee viſibly in Fevers of Cold there is a violent Obſtruction of the Glands of the Skin, the Mouth, Larinx, Stomach, in a Word, of all theſe Glands to which the cold Air is contiguous, and we can tell whence this Obſtruction proceeds: Beſides, this Fever may be increaſed to ſuch a Degree as to differ little in its Symptoms, Violence, or Duration, from other more dangerous continued Fevers; which is a clear Demonſtration of our Doctrine: For ſince an evident Obſtruction of the Glands produce Fevers ſo very like the moſt dangerous ones, why may we not conclude, that ſome latent or unknown Cauſe may produce ſo general and ſtrong an Obſtruction as is able to occaſion all the ſeveral moſt dangerous Fevers of this Kind?

8. But that which I take to be alone (without any other Proofs) a Demonſtration of our Theory, is, That in all Countries betwixt the Tropicks, their continued or [illegible] Fevers ariſe from a ſevere cold Wind ſuddenly blowing after exceſſive Gleams of Heat. This is ſo true, that all Travellers aſſign this as the Cauſe, having conſtantly obſerv'd their Fevers to ſucceed ſuch ſudden Changes of the Air. A pregnant Inſtance of which we have in *Phil. Tranſ.* for *Dec.* [illegible] *N°.* 259. in a Letter from Mr. *Hugh* [illegible] to Dr. *Woodroof*, concerning ſome Obſervations in *Mary-Land.* His Words are theſe; "[illegible]
" North-Weſt Wind is very ſharp in Winter
" and even in the Heat of Summer it mightily cools the Air; and too often at that
" Time a ſudden North-Weſtern Wind
" ſtrikes our Labourers into a Feaver when
" they are not careful to provide for it, and
" put on their Garments while they are at
" work". Thus he. And indeed the ſanguine Account of the Matter is this: The exceſſive Heat muſt neceſſarily dilate the Glands to which it is contiguous, *i. e.* all the

Cu

utaneons Glands, the Glands of the *Trachea*, *ronchi*, *Oeſophagus*, Stomach, and of the Inteines; and it will not only dilate them, but y the Aſſiſtance of the natural Action of eſe, which is Secretion) exhale their reective Liquors, making them ſtill flow ſo ng as the exceſſive Heat continues, and there is Blood which may ſupply them. ow they being thus dilated, and (by the flux of their Liquors) ſoften'd and made ungy, a ſudden exceſſive Cold ſupervening uſt ſtrongly contract their Orifices, and ngeal their flowing Liquors, and the reatneſs of their Contraction will be alays in Proportion to the Violence of the rmer Heat and ſupervening Cold conjunct. as is known from the Nature of Cold. nd this Contraction of their Orifices and ngelation of their Fluids will obſtruct Motion of the Blood almoſt up to the art, at leaſt to the next Diviſion of that tery which conſtitutes this Gland, whereboth the Blood will be increaſed as to Quantity, and perhaps (by this Stagnan of a Part of the ſame) as to the Quay thereof likewiſe. All which is but a rollary of our Theory.

9. Hence we evidently ſee the Reaſon of Frequency of our laſt Year's Fevers; for were then exactly (in Proportion to our mates) in the State of theſe betwixt the picks. Our Summer-day Heats were more lent than had been obſerv'd among us he Memory of Men, and our Nights had Way the Heat proportionate to our Days; des, we had often ſudden Changes, which not to violent as in theſe warmer Couns, yet had the ſame (tho' a ſlower) Effect mong them. And therefore it was that uent Vomiting were found ſo uſeful, ch (at leaſt in ſuch a Degree as was nd then neceſſary) is not always ſo ſafe. Practice was entirely conform to that of e Southern Countries, and the Neceſthereof will be underſtood when we e to ſpeak of Vomiting. The ſame Pra obtains in Fevers occaſioned by Surfeitor Drunkenneſs, which is ſtill to be ſuſed as a conſiderable Part of the Cauſe of rs in adult Perſons in great Cities.

nd generally, I ſhould think either the e-mentioned ſudden Changes (which happen a Thouſand other Ways different from the Seaſon) or a direct continued Fit of violent Cold, or Exceſſes in Eating or Drinking, one or all of theſe have a large Share in moſt of our continued Fevers.

10. *Laſtly*, It is no Ways accountable from any other Theory, (as I think) how theſe Liquors which are ſecreted from the Glands at the Diſſolution of Fevers could be ſo different from the ordinary Fluids which are there excern'd? From ours, it is evident, for an Obſtruction of the Glands muſt neceſſarily make their reſpective Liquors to ſtagnate, which will many Ways alter their Nature: But from any other Hypotheſis I do not ſee how this can come to paſs; which will lead me to conſider One or Two of the commoneſt Opinions about continued Fevers.

The moſt common and generally obtaining Opinions about Fevers, is, That they are more immediately produced by ſome Morbifick Matter (like a Poiſon), which mixing and circulating with the Maſs of the Blood, produces all thoſe frightful Symptoms which we feel. This Opinion is ſufficiently confuted, *Prop.* 222, 223, 224. *Part* 2. of *Borelli*'s Book *De Motu Animalium*, whither I refer the Reader, only adding (to what he has there adduced) this one Argument.

When any corrupt Matter is mixed with the Blood, ſo as to vitiate the whole Maſs, (as Vinegar among Water) the Way of curing ſuch a Vitiation is either by forming new Glands to derive the vitious Part of the Mixture; or by draining the whole Mixture, good and bad, and ſubſtituting new pure Blood in its Place; or, laſtly, by diſpoſing the already form'd Glands to ſecern the corrupted Part.

The Firſt of theſe is ridiculous.

Some Thing like the ſecond is done, when the Blood is really viciate in the Whole, as inveterate Poxes; but that Cure cannot here have a Place, as ſhall be afterwards ſhewn.

As to the third Way, let us conſider:

1. How hard it is to think, when the whole Maſs is ſuppoſed corrupted, that the vicous Part all at once, or in the Space of a few Hours, (in which we know, after a *Criſe*, Fevers commonly leave People) ſhould be entirely evacuated. This is not like the Actions of Nature, who works leiſurely and by Degrees.

2. Let us consider whence all the Glands (at least the greater Part of them) should be so alter'd (seeing their Configurations are so different, and naturally they secern so different Liquors) as all at one Time to separate the same Morbifick Matter. And,

3. How at the *Crise* only, and at no other Time, they should be so dispos'd.

It will be very hard in any other *Theory* (in this more particularly) save ours, to account for these Things without recurring to Miracles, or the absurd *Metaphorick* Terms of Sympathy, Antipathy, and the like. These then, with what *Borelli* has brought against this Opinion in the forecited Places, are abundantly sufficient to show the Ridiculousness thereof.

But there are several Physicians, who observing, that in Fevers there was (by a Vomit) a tough viscid Matter thrown out of the Stomach, have thought this Matter generated there, and mixing with the Mass of the Blood, might be a considerable Part of the Cause of *Fevers*, at least might considerably augment the same, and have from thence brought Arguments for the Necessity of Vomiting in Fevers.

This Opinion supposes these Things:

1. That the Quantity of the *Morbifick* Matter excern'd by a Vomit, before the Administration thereof, was existent in the Cavity of the Stomach, after the same Manner that other Things are which are derived into the Mass of the Blood, else it could never get thither. This I shall consider when I come to speak of the Operation and Effects of Vomiting.

2. That it is at least possible this *Morbifick* Matter may be deriv'd into the Mass of Blood. Let us at present consider this.

I know no Way any Thing of any tolerable Consistence can get into the Mass of the Blood, but by the *Lacteal Veins*. It is true, from the sudden Effects of some Spirits, Medicines, and strong Meats, we are certain that the more refined Parts of these may get into the *Brain*, without going the tedious Circle of the *Lacteals*: But this is done by the reciprocal Motion of the *Nerves*, the Necessity and mechanical Operation of which *Borelli* has demonstrated, *Prop.* 155, 157, 160. *part.* 2. *de Motu Animalium*. However, I think none will pretend such a Course for this viscous *Morbifick* Matter; and therefore if it gets into the Mass of the Blood, it must go the common Road of the *Lacteals*.

To decide the Matter, I must suppose my Reader to have consider'd the two last *Propositions (ex iis quæ ad Separationes)* which *Bellini* has in his *Preface* to his Book *de Urinis & Pulsibus, &c.* and the 27th, 28th and 40th, of his last Book *de Motu Cordis, &c.* where the Construction of the *Glands*, and the Manner of Separations, are demonstratively unfolded, which I take to be the noblest Discovery (in these Matters) of this Age. From these Places it is clear, that,

Prop. 1. A *Gland* is nothing but a great many Complications and Circumvolutions of the *Artery*, (all over the Coats of which little Branchings of *Nerves* pass, designed principally for the spiral Contortion thereof, that the Blood may be the more easily propagated through the same; but this is common to all the *Arteries* and *Veins*, whereby without any Interruption of the same Spirit the Propagation of the Blood (in the former from the Heart to the Extremities of the Body, and from the Extremities to the Heart back again (in the latter) is assisted) which sends out from the Sides thereof little Secretory Canals, which terminate in one common Conduit, and is call'd the *Emissary* of the *Gland*; or perhaps in a common *Pelvis* (as in the *Kidneys*) and the same *Artery* after these Windings degenerates into a *Vein*.

Prop. 2. That Separation or Secretion is perform'd by the Composition of two Motions in the Fluid; one propagated through the Length of the Canal, another transverse through its Sides; for it is demonstrable that all Fluids press *undiquaq*; and that the Direction of their Pressure is perpendicular in every Point to the Sides of the containing Vessel; the Composition of which two is the Motion (or rather Direction) of the separated Fluid.

Prop. 3. That in a mix'd Fluid, consisting of greater and lesser Cohesion of Parts of greater and lesser Fluidity, that which has the least Cohesion and greatest Fluidity is first separated, *i. e.* is separated in the *Gland* whose compounding *Artery* is shortest, or at least Distance from the Heart or Fountain of Motion; and these of the next Cohesion and next greatest Fluidity, is next separated

d ſo on; the Diſtances from the Heart be- g in a compounded Proportion of theſe.

Prop. 4. That the *Inteſtines* are really ſuch *Gland*, and the moſt viſible one in the Bo- , whoſe Secretory Veſſels are the *Lacteals*, d whoſe common Conſervatory or *Pelvis* the *Receptaculum Chyli*.

To theſe I ſhall add (becauſe of its Affi- ty) the following:

Prop. 5. The Quantity ſeparated in every *and* is in a compounded Proportion of e Celerity of the Fluid at the reſpective ifices, and of the Orifices themſelves of e ſeparating Canals.

I ſhall here ſubjoin the Demonſtration of is Propoſition, referring that of the reſt to eir Author.

DEMONSTRATION.

THE Orifices being given, the Quan- tity ſeparated is as the Celerities of the uid; for in a greater Celerity, there is a eater Quantity ſeparated; in a leſs Cele- y, a leſſer Quantity. The Celerities being ven, the Quantity ſeparated is as the Ori- es; for at a great Orifice, there is greater uantity ſeparated; at a leſs Orifice, a leſ- Quantity: And therefore neither being ven, the Quantity ſeparated is as the Ce- ities and the Orifices conjunctly, *q. e. d.*

From all theſe I draw the following

COROLLARIA.

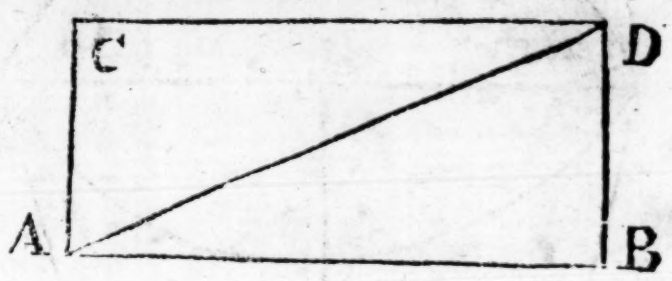
THE ſeparated Fluids differ only in their Degrees of Coheſion and Fluidi- *per Prop.* 2.

2. The Reaſon why Fluids of different grees of Coheſion and Fluidity are ſepa- ed in ſuch and ſuch *Glands*, is the diffe- t Degrees of the Velocity of the Fluid at reſpective Orifices of the ſeparating Veſ- , and the Differences of the Orifices them- es, *per Prop.* 3.

3. The *Glands* themſelves differ only in Length of the *Artery*, the Difference and mber of its Complications and Convolu- ns, *per Prop.* 1.

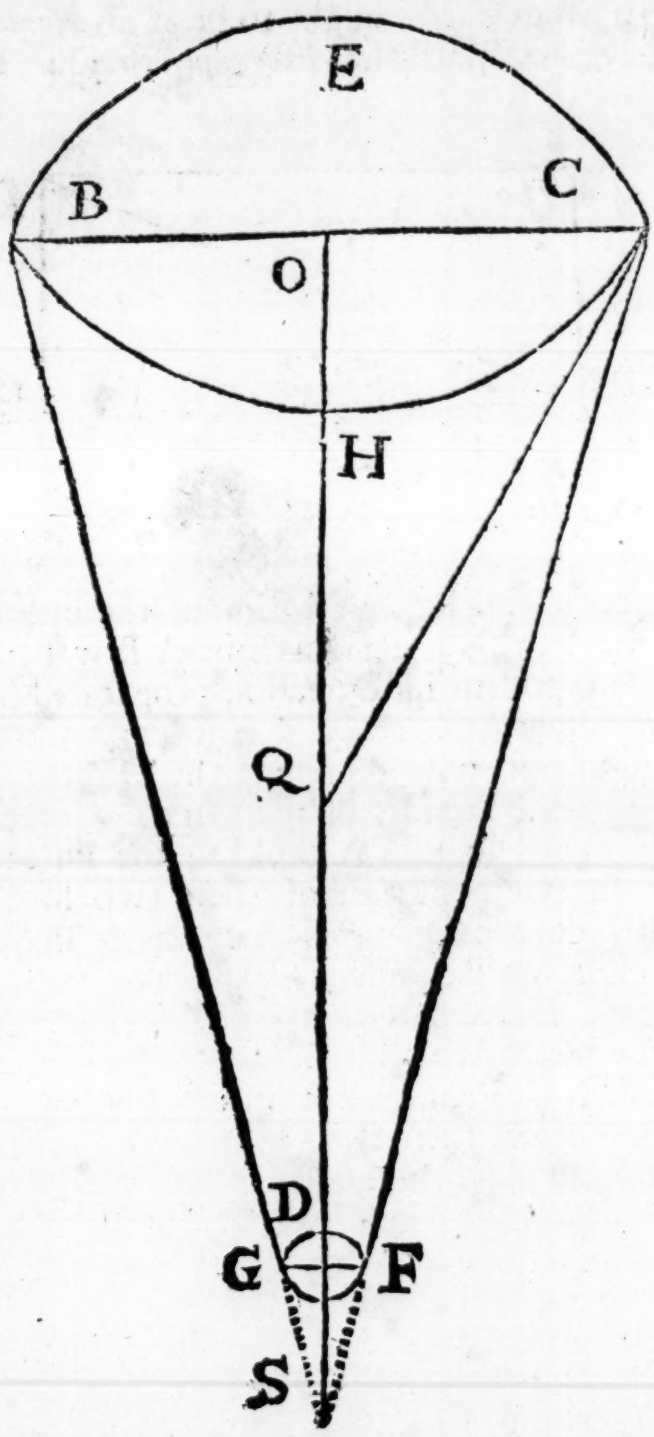
4. Each *Gland* (naturally and equally rking) ſeparates only the Fluid proper to elf, *i. e.* peculiar to ſuch Lengths and mplications, of ſuch Degrees of Fluidity or Coheſion, to ſuch Bigneſs or Smallneſs of the Orifices of the ſeparating Canals, *per Prop.* 3, and 5. But this laſt is of ſmall Conſideration.

5. That Secretion may be performed the moſt eaſily that may be, the Inſertion of the ſeparating Canal ought to be at an *Angle* of 45 Degrees with the *Artery*, *per Prop.* 2. For



let A B repreſent the *Artery* (if it make a right Line) or its *Tangent* (if it make a Curve), and let the Motion of the Fluid be from A to B, the right Line A B will likewiſe repreſent its Direction propagated from the Heart. Erect at A the perpendicular A C; this will repreſent the Direction of the lateral Preſſure of the Fluid. Compleat the Parallelogram A B C D; the Direction of the Compoſition of theſe two Motions will be the Diagonal A D, as is known; which in the preſent Caſe makes an Angle of 45 Degrees with the *Artery* A B. This were well worth the obſerving (if it be poſſible) in Animals; but it muſt be in live ones, before their Parts have alter'd their Poſitions. And here it were worth the examining likewiſe, whether what Mr. *Newton* has demonſtrated (*Schol. Prop.* 35. *Lib.* 2. *Princip. Phil. Mathem.*) about the Reſiſtance of *Conical* Figures, obtains in Animal Bodies; for though his Demonſtration be only concerning *convex Cones*, yet the ſame obtains in *concave* ones; wherefore ſeeing the *Artery* betwixt any two *Branchings* is a *Conus truncatus*, it may be repreſented by the Figure following, C E B G F. Now ſeeing the Diameter C B of the Baſe of this *Conus truncatus*, and the Diameter F G of the Baſe F D G of the *Conus abſciſſus* F D G S, as likewiſe their Diſtance O D, may all be had, it is evident that the entire *Cone* C B G S H may be had likewiſe: Wherefore biſect the Diſtance O D in Q; and if it be found (having drawn C Q) that Q S is equal to Q C,

Q C, then the *Conus Truncatus* C E B G F (among all of the ſame Baſe and Altitude) gives the leaſt Reſiſtance to the Blood flowing from O to D. I am inclined to think



this may obtain in the Trunks of the great *Arteries* betwixt their Branchings, for no further is to be conſider'd. This I recommend to be examined for the Honour of that great Man, who has crowded up in this *Scholium* (not to mention the reſt of his admirable Book) a vaſt Number (if retailed) of moſt charming and uſeful Truths.

To come now to the Buſineſs. The *Teſticuli Humani* are granted by every one to be *Glands*; and *Bellini* has found the Length of the complicated *Artery* in one of them to be 300 Ells, and the Altitude of one of these *Glands* (when freed of its Integuments) to be $\frac{1}{16}$ Ell; whence I conclude, there muſt be 4800 Plications or Circumvolutions in one of theſe *Proxime*. He likewiſe aſſerts, that *(cæteris Paribus)* if two Fluids of the ſame Nature, with equal Velocities, the one be forced into a Canal of the ſame Number and Lengths of Complications as are in the foreſaid *Gland*, and the other into a ſtraight Canal of the ſame Length, the Velocity (at or about their *Exits*) of the firſt Fluid, to that of the ſecond, will be as 1 to 430. He has not indeed ſubjoin'd the Demonſtration: But if we ſuppoſe the *Artery* to have *Plicæ* or Folds of ſuch Number and Length as we have juſt now determined (which perhaps not far from Truth); and if we ſuppoſe the Turnings of the *Plicæ* to be circular, (which perhaps may follow from this, that ſeeing a Circle is the only ordinate Figure of an infinite Number of equal Sides and equal Angles, it muſt be the only Curve which can make (in all its Parts) the Angle of *Incidence* equal to the Angle of *Reflexion*, and conſequently the only *Curve* in which a Fluid would moſt eaſily turn;) and likewiſe the Arch in which they turn to be a Semicircle, which it muſt be, if the Sides run parallel after the Turning; and univerſally, if the Sides produced make any Angle from the Quantity thereof, the Quantity of the Arch in which they turn may be determined: I ſay, from theſe *Data* the ſame Proportion may be by Calculation determined; or perhaps more briefly by Experiment, thus:

Take a Pipe of Metal of any Diameter, and fold it into any determined Number of *Plicæ*, whoſe Sides may run parallel, and whoſe Lengths may be $\frac{1}{16}$ Ell: Then by a Weight force a Liquor through it, and obſerve the Time betwixt the firſt Entry of the Liquor into the complicated Canal, and its firſt Appearance at the other Orifice: then take another ſtraight one of the ſame Length with the former, and with the ſame Weight force the Fluid through it, obſerving the ſame Way the Time of its Paſſage. The Lengths being the ſame, the Velocities muſt be as the Time of paſſing reciprocally, and known. Having thus got the Proportion

their Velocities in any one determined
umber of *Plicæ*, we may (by the Rule of
ree) have their Proportions in any aſſign'd
umber thereof. Suppoſing then that this
at Man has found the Truth of the fore-
d Proportion from ſome ſuch Way as one
theſe, it follows, that in every Turning the
locity muſt be abated $\frac{1}{4800}$ of the whole
oxime; (for $4800 . \frac{4799}{4800} :: 4800 . 1.$)
w let us ſuppoſe the Proportion of the
heſion and Fluidity of the Fluid ſepara-
in the *Teſticuli Humani* to the Coheſion
Fluidity in our *morbifick* Matter, now
ived from the Stomach into the ſmall *In-*
ines, to be as 1 to 2. (I mean, the Cohe-
n and Fluidity of the Fluid ſeparated in
Teſticuli Humani as it is when immediate-
ſeparated; for when it has lodg'd any
ne in the *Veſiculæ Spermaticæ*, we know,
its Ebullitions, and the Evaporation of
thinner Parts, it loſes a great deal of its
idity.) And that this is a liberal Al-
ance, is evident from *Leeuwenhoeck*'s Ex-
iments ſcatter'd up and down the *Phil.*
nſ. and printed all together at *Amſter-*
; where we may ſee, from the *Micro-*
ical Obſervations he has made on this
d, its Fluidity is little leſs than that of
mon Water; and conſequently, at leaſt
times more than that of our *morbifick*
ter.

nd here I hope it will not be impertinent
ſet down a Propoſition to compare the
cidities of different Liquors.

PROPOSITION.

T two Drops of two different Liquors
fall into a Pair of fine Scales, (a Drop
he one Liquor into the one Scale, and a
p of the other Liquor into the other
) ſo that there fall no more than juſt
own Gravities carry down: Thus you
have what I here call their comparative
ities, and by the ordinary Method, you
likewiſe have their ſpecifick Gravities.
e being given, I ſay, their Viſcidity
Coheſion ſhall be in a compounded
ortion of their ſpecifick Gravities reci-
lly, and their comparative Gravities
tly. The Demonſtration is eaſy from
Nature of Fluids.

t us again ſuppoſe the Length of the ſmall Guts (for it is there only where any Thing is ſeparated from the *Inteſtines)* to be 6 Yards, and that in every $\frac{1}{8}$ of a Yard, there is a Plication; (and that theſe are likewiſe liberal Allowances, any who have ever ſeen a Diſſection will know) then there will be 96 Plications in the whole, and conſequently the Fluid in theſe *Inteſtines* will loſe but 96 Parts of the whole Celerity it had at its Entry.

Laſtly, Let us ſuppoſe that Celerity to be equal to the Celerity of the Blood, when it firſt enters the Plications of the *Teſticulus Humanus*; which all will readily grant who conſider, that there is never any Thing found in theſe ſmall Guts, but a thin Liquor in a wide Canal, thruſt forward by the Force of the *Fibres* of the *Stomach* and *Inteſtines*. Let us call this Celerity *a*.

Now from *Corol.* 1, 2, and 3, about Separation, if a Viſcidity as 1 give 4800 Plications, then a Viſcidity as 2 will give 9600 ſuch: And therefore, that ſuch a viſcid Liquor ſhould be ſeparated, it is requiſite it ſhould loſe 9600 Parts of the whole Celerity; but (as has been juſt now ſhown) by the *Plicæ* of the *Inteſtines*, the Fluid will loſe but 96 Parts of the Celerity *a*. Whence it is abſolutely impoſſible that the *Inteſtines* ſhould ſeparate this viſcid Matter, unleſs they were a hundred times longer than they are; for $96 . 9600 :: 1 . 100$. If the Viſcidity of the Fluid ſeparated in the *Teſticulus Humanus* were to that of our *morbifick* as 1 to 10, then the ſmall *Inteſtines* behoov'd to be five hundred times longer than they are. And indeed I believe the Proportion really not to be under 1 to 50, and then they behoov'd to be at leaſt 25 hundred times longer than they are.

Thus we ſee the ſecond Thing this Opinion ſuppoſes is falſe; and indeed it hardly could be otherwiſe; for (in my Opinion) the *Fæces* themſelves might more probably get into the Maſs of the Blood than this viſcid Matter, the Parts of theſe being only united by a ſimple Contact; whereas the Parts of this are join'd by a very ſtrong *Niſus*. And I remember, Dr. *Liſter*, ſomewhere in the *Phil. Tranſ.* relates how he tried to get in a very fine ting'd Spirit into the *Lacteals* of a live *Dog*, by cutting the ſmall Guts, and injecting the Liquor, then ſewing

ſewing all up again; but he could never get it done to his Satisfaction. And here it is to be obſerv'd, that People may be deceived with blue Tinctures; for this is the natural Colour of theſe *Lacteals* when they are almoſt or altogether empty.

If it be objected, 1. That the Concoction of the *Stomach* and *Inteſtines* may fit this *morbifick* Matter to be ſeparated by the *Lacteals*. 2. That the *periſtaltick* Motion and the *Valves* of the *Inteſtines* may hinder the quick Motion of the compounded *chylous* Matter. 3. That there are ſome Medicaments, as *Turpentine*, *&c.* which we know, by their Effects, get into the Maſs of the Blood, and yet are more viſcid than our *morbifick* Matter. 4. That there is really as viſcid Matter ſeparated in ſome other *Glands*, as the *Bile* and the *Phlegm*.

To theſe I anſwer,

1. As to the Firſt; ſeeing *Triture* is the only Effect of the *Stomach* and *Inteſtines*, there is no Advantage to be reap'd thence; for no Beating nor Grating will diſſolve the Union of this *morbifick* Matter. Beſides, where it is in any Plenty, the Effects of Concoction are very ſmall, or none.

2. As to the Second; the *periſtaltick* Motion being reciprocal, it adds as much to the Motion of the *chylous* Matter in its Deſcent towards the *Rectum*, as it takes away in its Aſcent towards the *Stomach*, and ſo cannot ſerve that End, the *Plicæ* and Circumvolutions of theſe *Inteſtines* (which we have conſider'd) being only to be rely'd on for this Purpoſe. As to the *Valves*, we know they all open toward the *Rectum*, and ſerve only to ſtop the Aſcent of the *Fæces* in the periſtaltick Motion, and ſo cannot retard the Motion of the *chylous* Matter.

3. As to the Third; we likewiſe know, that all theſe Medicaments are diſſolv'd into a thin Liquor by Heat (as *Turpentine*, *Butter*, *&c.*) Beſides that, only the moſt ſpirituous and leaſt viſcid Parts enter the Blood, which is not ſaid of our *morbifick* Matter.

4. As to the Laſt; there is a great Difference betwixt a Liquor immediately after it is ſeparated, and when it has ſtagnated ſome Time in the Conſervatory of the *Gland*; for then the aqueous and more humid *Parts* evaporate, and by its Stagnation it acquires an Ineptitude to Motion; and tho' the Blo flows very eaſily in the *Arteries* and *V* yet I defy any to cauſe extravaſate Blood enter its Veſſels again. But more partic larly, we muſt conſider the *Liver* to be a ry large Veſſel, and (if it were evolved) make an *Artery* many thouſand times lon than that of the Canal of the ſmall *teſtines*, or *Teſticulus Humanus* either; and it is no Wonder it ſeparate a viſcid Matter the Motion of the Blood there being ſo ſmall: But ſtill I aſſert it is not near viſcid as our *morbifick* Matter. As to *Phlegm*, we know it is not naturally pro duced; and the *morbifick* Matter it (againſt which we diſpute) might be well objected; for it is only the Stagnati Corruption and Evaporation of the Hum dity, which occaſion both. The ſame m be ſaid of the purulent Matter which pa by *Urine*, but that we know it proc from an *Ulcer* in the *Kidney* or Neck the *Bladder*, and is not ſecern'd with *Urine*.

Having dwelt thus long on the Opini of others, I come now to conſider the p per Remedies of Fevers; which I reduce 1. *Blood-letting*; 2. *Vomiting*; 3. *Purg* and, 4. The *Medicaments* which increa leſs *ſenſible Evacuations*; under which I comprehend Sweating, Perſpiration, the like.

I do not here conſider Bliſtering, and ward Applications, ſeeing (in my Opin they are only uſeful to remove the accide Effects, and not the Cauſe of Fevers, w out which they cannot be ſaid to be cured.

1. As for *Blood-letting*. The Subject fully and learnedly treated by *Bellini* in foremention'd Books together, that it equally impoſſible as impudent to offer any Additions; and therefore, for entire ſatisfaction on this Head, I ſhall refer Reader to theſe Books.

2. As to *Vomiting*; I ſhall comprehend I have deſign'd to ſay about it in theſe ticulars: 1. I ſhall ſhow that Vomiti partly produced by the *Vis ſtimulans V rii*: But, 2. That it is moſtly occaſione the *Vis ſtimulans* of the *morbifick* Matter cern'd from the *Glands* of the *Stomach*.

all prove that this *morbifick* Matter is not the Cavity of the *Stomach* (at leaſt in ſuch enty as it is excern'd by a forc'd Vomit) fore the Ingeſtion of the ſaid Vomit. 4. I all give the whole Deduction and Con-xion of this Operation. 5. I ſhall conſi-r the Advantages of the ſame in the Cure Fevers.

Before I come to handle theſe, it is neceſ-y I firſt explain what I here mean by a *s ſtimulans.*

By a *Vis ſtimulans*, I underſtand ſuch a uality in a Fluid, whereby the Particles ereof are diſpos'd to make a real Diviſion, a violent Inflexion, of the *nervous* and *mbranous Fibres* of the Body, which occa-ns frequent and forcible Reciprocations, ccuſſions and Derivations, of the *Liqui-m Nervorum* into the *Muſcles* and con-ctile *Fibres* of the Canals; whereby all involuntary *Muſcles* are brought into olent Contractions, and the Emiſſaries of *Glands* are ſqueez'd.

Thoſe who deſire a fuller Account of the ature and mechanical Operations of this *ſtimulans*, may ſee it *Pag.* 165 *& ſeq.* of *lini's* Book *de Urinis & Pulſ. & Prop.* 52 his laſt Book *de Motu Cordis.* I ſay then, 1. *Vomiting* is partly produced by this *Vis ulans Vomitorii.* This is evident from ſe Conſiderations: 1. Becauſe ſometimes immediately vomit upon the Ingeſtion the Vomitory, before the *morbifick* Mat-excern'd from the *Glands* of the Stomach ld have Time to concur. 2. We throw very often the ſame we had taken in, h little or no Mixture; which could not ppen, if the *morbifick* Matter had con-red to produce the Fit. 3. Sound Per-s (in whoſe Stomachs there is little or e of this *morbifick* Matter) often vomit n a too plentiful Ingeſtion of an (other-ſe) inoffenſive Liquor; the only Reaſon which muſt be, that the Stomach not be-able to derive into the Maſs of the od the ſaid Liquor ſo faſt as it is pour'd it muſt ſowr on the Stomach, and there-acquire this *Vis ſtimulans*, whereby it is own out; or perhaps it may ſtill have a *ſtimulans*, though not (when it is in a ll Quantity) ſufficient to bring the Sto-h into that violent Contraction which is eſſary in Vomiting: But this ſmall *Vis ſtimulans* being multiplied by the too great Quantity of the Liquor, may acquire ſuffi-cient Force to produce the Effect; as we ſee ſeveral Things loſe the Quality to produce their viſible Effects when in ſmall, which they had when in great. But,

2. I ſay, *Vomiting* is moſtly occcaſion'd by this *Vis ſtimulans* of the *morbifick* Matter ex-cern'd from the *Glands* of the Stomach; and that for theſe Reaſons: 1. The Action of the *Vis ſtimulans Vomitorii* being terminated at or near the internal Surface of the Sto-mach, after one or two plentiful Fits of Vo-miting (there being produced thereby ſuch a Succuſſion and Compreſſion of the Sides of the Stomach) theſe *Particulæ ſtimulantes* muſt neceſſarily be diſentangled, and ſo there could be no more Fits of Vomiting, which is contrary to Experience. 2. We evidently ſee in Sea Vomits, and in thoſe produced by the Joltings of a Coach in ſome People, there is no *Vis ſtimulans Vomitorii* to which we can attribute this Effect; and therefore it muſt neceſſarily be produced by the Vellica-tions of the morbifick Matter excern'd by this particular Motion; the Manner of which may be thus explained: Every parti-cular Body has a determined Degree of Ten-ſion, and a determined Length; and if a like Reciprocation of Motion (by whatever Cauſe) be produced in the ambient *Medium*, which would neceſſarily be produced by another Body (when moved) of the ſame Degree of Tenſion, and of Length commen-ſurable to the Length of the firſt Body, there muſt be of Neceſſity a Motion pro-duced in that firſt Body, eſpecially if the Motion of the *Medium* be violent, and the commenſurable Lengths be as the firſt Num-bers of the ordinary Arithmetick Progreſ-ſion, 1 to 2, or 1 to 3, or 2 to 3, *&c.* This is evident in the uniſon or concordant Strings of greater Muſical Inſtruments; and the Reaſon is, becauſe thereby the *Oſcillations* of ſuch Bodies become commenſurable. Now I ſuppoſe this particular Motion of jolting Coaches and Ships, to be ſuch as would be produced by another Body having the juſt now mentioned Analogy to the *Nerves* of the *Glands* of the Stomach, whereby they are brought into Motion, and conſequently de-rive great Plenty of their *Liquidum* into the Places, which makes ſuch Contractions

as ſqueeze theſe *Glands* of the Matter that produces theſe Fits of Vomiting. Beſides that, the ſame Cauſe may (upon other *Fibres*) produce the antecedent Sickneſs which we feel in Sea Vomits. 3. By a Vomit of warm Water (for Example) there are often produced ſeveral Fits of Vomiting; and yet we all know there is no *Vis ſtimulans* in it; ſo that all it can do is, that by its Warmth (which is a Kind of a *Fotus*) it elicits the Matter from the *Glands* of the Stomach, which occaſions this Vomiting. I could add a great deal more to confirm this Propoſition, but I think this ſufficient. I ſay,

3. That the *morbifick* Matter (excern'd by Vomiting) is not exiſtent in the Cavity of the Stomach (at leaſt in ſuch Plenty as it is excern'd by a forc'd Vomit) before the Adminiſtration thereof. 1. This is an evident Corollary from the former *Propoſition*, The Vomit does not act (at leaſt after the firſt one or two Fits) by its own *Vis ſtimulans*. There is (in Vomiting) produced a violent Contraction of the *Fibres* of the Stomach, the *Muſcles* of the *Abdomen* and *Diaphragm*, which muſt be occaſion'd ſome Way. There is nothing (in Vomiting) which can occaſion this, but either the *Vis ſtimulans Vomitorii*, or of the excern'd *morbifick* Matter; and ſince (as has been already proved) it cannot be the former, it muſt of Neceſſity be the latter: Wherefore if the *morbifick* Matter were already exiſtent in the Cavity of the Stomach, the Vomit were of little Uſe after one or two Fits, which is contrary to Experience. 2. If this *morbifick* Matter were already in the Cavity of the Stomach, it is not poſſible but that one or two plentiful Fits of Vomiting would eject all that is there; ſo that afterward there ſhould none be thrown out, however violent the conſequent Fits were, which is likewiſe contrary to Experience. The Force of the *muſcular Fibres* of the Stomach, the *Muſcles* of the *Abdomen* and *Diaphragm*, (which two laſt Monſieur *Chirac*, Profeſſor of Medicine at *Montpellier*, by an eaſy Experiment, has ſhewn to concur principally in Vomiting; *vide the Preface of Tournfort's Hiſtoire des Plants qui naiſſent aux environs de Paris*) is at leaſt equal to 260000 *lb.* weight, (the Force of the Muſcles of the *Abdomen* and *Diaphragm* being more than that of 248000 *lb.* and of the Stomach not inferior to that of 120000 *lb.*) which Force if it be not ſufficient to drive out all that is exiſtent in the Cavity of the Stomach (however viſcid that Matter be) I leave every one to judge. 3. Suppoſing the *morbifick* Matter already in the Cavity of the Stomach, it is impoſſible to give an Account of the different Effects of different Vomits. For Example, why an *Antimonial* Vomit does excern this *morbifick* Matter more plentifully than Whey or warm Water. For if before the Ingeſtion of either, the *morbifick* Matter is already in the Stomach, then the only Thing left for them to do, is to excite the Act of Vomiting. But it is certain they may be both brought to be equal in that, *i. e.* they may be both brought to excite an equal Number of Fits of Vomiting, and that with equal Violence, (by taking their Quantities in a reciprocal Proportion to their vomitive Faculties) and yet their Effects be very different. I omit (for avoiding Tediouſneſs) the other Arguments I can adduce to confirm this Propoſition.

4. The whole Deduction and Connexion of this Operation is thus: The Particles of the Vomitory, by their *Intruncation* into the Orifices of the *Emiſſaries* of the *Glands* adjacent to the Surface of the Stomach, do diſſolate the ſame, (which by ſome extrinſick Cauſe had been contracted) and after the ſame Manner do diſſolve (at leaſt in ſome Degree) the Coheſion of the ſtagnant *morbifick* Matter, and render it more fluid, and conſequently its Reſiſtance leſs. Now the natural and conſtant Action of the *Glands* being Secretion, and the *Impedimentum* (viz. the Dilatation of the Orifice, and Attenuation of the Fluid) being totally taken away, or at leaſt made leſs than the natural *Impedimentum* of the *Glands*, the Matter muſt neceſſarily flow into the Cavity of the Stomach, till it be accumulated in ſuch a Quantity (which not being to be done in an Inſtant, muſt require ſome Time) as is ſufficient (by the united Loathſomeneſs and the *Vis ſtimulans* of it and the Vomitory) to vellicate and force the *Fibres* of the Stomach, *Abdomen* and *Diaphragm*, (by the Communication of the *Nerves* of the firſt with the two laſt) into a violent Contraction, and thereby throw all out by the *Oeſophagus*, which brings all to Quiet again, till the

anew a ſufficient Quantity excern'd from ſe *Glands* to reproduce the foreſaid Con-ction. And thus there happens a Fit of miting and Quiet alternately, till either the *morbifick* Matter be thrown out, or Force of the Vomit ſo diluted, that it's longer able to elicit the *morbifick* Matter n the *Glands*. Beſides theſe primary Ef-s of Vomiting, there are two others, ich ought not (tho' leſs principal to be itted. The firſt is, that in a ſtrong Vo-, or in one which requires ſome conſide-e Time before it operate, there often es ſome Part thereof from the *Stomach* the *Inteſtines*, and occaſions a gentle ge, by diſſolving the *Fæces*, and vellica-the *Fibres* of the *Inteſtines*; as ſhall be e particularly ſhown when we ſpeak of *ging*. However, the Effects of this Purge ſeldom or never go beyond the *Primæ* ; for all gentle Purges (of which this is are confined within theſe. The ſecond hat the ſtrong Contraction in ſo many *cles* and *muſcular* Canals, which are at k in Vomiting, and the violent Con-on which is produced over the whole , by a Power (as has been ſaid) which t inferior to that of 260000 *lb.* weight, and often does take away the Ob-tions in many other Canals than thoſe h are more immediately concern'd about *tomach* and *Oeſophagus*; as we evidently that vaſt Sweat which always breaks fter plentiful Fits of Vomiting. From deduce,

The Advantages of Vomiting in the f Fevers; which are, 1. The taking the Obſtructions of the *Glands* of the *h*, and (ſometimes) of the *Inteſtines*, is the principal Uſe of Vomiting; ow great a Step this is toward the Cure ers, every one will ſee who conſiders, n Fevers occaſioned by Intemperance, *tomach* is the Scene where this great ief is both contrived and put in Exe-, the Obſtruction of the *Glands* there-ng the firſt and principal Cauſe of evers. And in Fevers occaſioned by the *Stomach* and *Inteſtines* being moſt , and leaſt defended from the cold ceives its firſt and ſtrongeſt Impreſ-which two (as formerly was ſaid) he moſt conſiderable Share in the Cauſe of our Continued Fevers: And there-fore it is, that Vomiting (being timeouſly and plentifully us'd) very often prevents ſuch Fevers. 2. Another Advantage of Vo-miting is, that by the ſtrong Contraction of the *Muſcles* and *muſcular* Canals, and the violent Concuſſions of the whole Body thereby produced, the Obſtructions of ma-ny other *Glands* are removed (as has been juſt now ſhown); ſo that this, with the former, (removing ſo conſiderable a Part of the Cauſe) enables Nature to perform the reſt very eaſily. 3. A third Convenience (if not Advantage) of Vomiting is, that it is leſs dangerous than many of the Medica-ments that are taken inwardly. The Effects of this is confined to the *Primæ Viæ* (by which I always mean that winding Canal which is continued from the Mouth to the *Sphincter Ani*), and is conſequently leſs dan-gerous than thoſe which run the Circle of the Blood: For it is not to be doubted, that all Alterative Medicines have more or leſs Danger in them, from the Effect of their Stimulations upon the *Nerves*, their Fer-mentations with the Blood, their ſeparating or promoting the natural Coheſions of the Liquors of the Body, and their many other unknown Productions. That which goes the leaſt Way, muſt therefore have the leaſt Danger. Now ſince it is certain, that Vo-miting does not go out of the *Stomach* and *Inteſtines*, (where the Canals are ſtrong and wide, and the Fluids are viſcid and groſs) there muſt of Neceſſity be leſs Danger in it, than in thoſe which enter into narrower and weaker Canals, fill'd with more fluid and finer Liquors. It is true indeed, there is ſome Hazard from the burſting of the Ca-pillary Veſſels of the internal Surfaces, by the violent Concuſſions of the Body, occa-ſioned by Vomiting; but this is eaſily pre-vented by Blood-letting, which ought al-ways to precede the plentiful Uſe of Vomi-tories in all Diſeaſes. Beſides, ſometimes the Violence of a Vomit is too great for the Strength of the Patient: But this is rather the Fault of the Phyſician than the Phyſick; for the Strength, and conſequently the Vio-lence of Vomits (as of all other Medicines) ought to be adjuſted by this Proportion, *viz.* they ought to be in a compounded Pro-portion of the Strength of the Patient,

and the Danger of the Continuance of the Diſeaſe. If this were obſerv'd, none could ever err in the Adminiſtration of Medicines.

3. We come now to that which we call'd the third proper Remedy of Fevers, to wit, *Purging*; in explaining of which, I ſhall, 1. Shew that Vomitive and Purgative Medicines differ only in Degrees of the ſame Quality. 2. I ſhall give a ſhort Account of the ſeveral Steps, and of the Manner, of this Operation. And, 3. Conſider its Uſe in the Cure of Fevers. I ſay then,

1. That Vomitive and Purgative Medicines differ only in the Degrees of the ſame Quality; *i. e.* Purgative Medicines, by increaſing their Force vaſtly, and confining it to a leſſer Quantity, either of a Fluid or ſolid Body, become Vomitive; and Vomitive Medicines (if diluted) become Purgative. This will be evident from theſe Conſiderations: 1. We find by Experience, a ſtrong Purge never miſſes (if either it be very ſtrong, or the Patient not very ſtrong) to vomit; and the weaker Part of a Vomit, which eſcapes into the *Inteſtines*, does frequently purge us. 2. The ſame Medicines (for Example, *Vinum Emeticum*) taken by the Mouth will provoke Vomiting, which given by Way of *Gliſter* will purge. The ſame obtains in all ſtrong *Emeticks*. In ſhort, all ſtrong Medicines of either Kind conſtantly produce both theſe Effects. The Reaſon of all which is this: If the Medicament of either Kind be ſo ſtrong as immediately to vellicate and ſtimulate the *Fibres* of the Stomach, to dilate the Orifice, and attenuate the Matter contained in the *Glands* thereof, it produces Vomiting; if it act but gently, ſo as only to aſſiſt the natural Motion of Digeſtion, it goes by the *Inteſtines*, and diſſolves the Coheſion of the *Fæces*, and finding there more ſenſible *Fibres*, is able to bring them into violent Motions, which produce Purging; as ſhall be juſt now ſhown. 3. It is impoſſible in any other *Theory* to account how theſe two different Medicines ſhould upon the ſame Parts produce different Effects; for both theſe Medicines are taken by the Mouth, go down the *Oeſophagus*, and enter into the Stomach, either in the Form of a *Liquid*, or are there by it reduced into a *Liquid*, and conſequently are brought in to contact with and operate on the ſame *Fibres*, *Glands* and *Membranes*, and yet produce (by their Aſſiſtance) two different Effects. It is ſimply impoſſible to explain the Manner of this, without ſaying the one acts more powerfully and forcibly, and makes more violent Contractions, and conſequently is thrown up the moſt patent Way; the other more gently and ſoftly, and has thereby Time to ſeek out the leſs obvious Paſſages.

2. The Account of the ſeveral Steps, and of the Manner, of this Operation, is thus: Purgative Medicines being received into the Mouth, and admitted into the Stomach, their Particles vellicate and ſtimulate the *Fibres* thereof, and thereby increaſe the digeſtive Faculties, *i. e.* bring the *muſcular Fibres* of the *Stomach*, the *Muſcles* of the *Abdomen* and *Diaphragm*, into more frequent Contractions than ordinary, till they are admitted into the *Inteſtines*, the *Fibres* and *Glands* of which being more ſenſible than thoſe of the *Stomach*, (whoſe Parts, by the frequent rough Contacts of one againſt another, and of the groſs Bodies which are often thrown into it, are as it were deaden'd) they excite to move and bring them into frequent and forcible Contractions, whereby theſe *Glands* are ſqueez'd of a Fluid which lubricates the Paſſages, and mixing with the fæculent Matter of the *Inteſtines* (which is render'd fluid by the ſame active and ſtimulating Quality of the Purgative Medicine) renders it more fluid, by which (and by the more frequent ordinary Contractions of the *Inteſtines*) it paſſes more plentifully and eaſily into the *Rectum*, and is thence ejected. This is the Uſe of the more gentle Purges, which only cleanſe the *Inteſtines*. But thoſe of more Force (beſides all theſe) do (as to the groſſer and more ſpirituous Part) enter into the Maſs of the Blood by the *Lacteals*, and by mixing therewith, produce many unnatural Fermentations therein, ſeparating or promoting the natural Coheſions of the Liquors of the Body, and occaſioning many other unknown Effects, as has been formerly ſaid: And likewiſe there, vellicating the ſpiral *Fibres* of the *Arteries* and *Veins*, excite theſe into more forcible Contractions, and thereby promote the Circulation of the Blood, and make it run with greater

ity and Force; and by this Means in a ſhort Time waſh away any Obſtructions, that either happen to be in the more direct *Arteries*, or the more complicated ones which conſtitute the *Glands*, increaſe the inſenſible Perſpiration, and purify the Blood of all the groſſer and more noxious Parts by the *Ductus Choledochus* and *Pancreaticus*, which void themſelves into the *Inteſtines*. All theſe Effects of the more powerful Purgatives are viſible; for ſometimes after one has taken ſuch a ſtrong Purge, we find the Pulſe mightily increas'd, the Perſpiration augmented, the Spirits or *Liquidum Nervorum* ſpent, the viſible Excretions by Siege and Urine much greater, and the Body weaken'd, eſpecially after a few Days of ſuch a Courſe; whereby it is evident, theſe Medicines muſt operate after the Manner now explained. From hence it is clear,

3. That the Advantages of Purging in the Cure of Fevers are very great, upon theſe two Conſiderations: 1. If the Purge be more gentle, ſo that it only ſerve to cleanſe the *Inteſtines*, it partly takes away the Obſtruction of the *Glands* of the *Stomach*, and totally that of the *Glands* of the *Inteſtines*, which is a conſiderable Step toward the Cure. But, 2. If the Purge be more violent, ſo that it enter in any Plenty into the Maſs of the Blood, it conduces ſo much toward the Removal of the Obſtructions of moſt of the other *Glands*, that Nature is able to perform the reſt very eaſily her ſelf. But alas! this laſt Caſe has ſo much Danger and ſo many Inconveniencies in it, as render it as unſafe, as otherwiſe (if theſe could be remov'd) it would be uſeful. *Bellini*, in his Book *de Urinis & Pulſibus*, *page* 222. has demonſtrated, that in violent Purges there is a greater Danger by far than in Blood-letting. His Words are: *Quia vero quicquid eſt Suſpicionis in Miſſione Sanguinis ad ſolum Fermentationem non naturalem, quæ poſſibilis per ipſam eſt in reliquo Sanguine, redigitur, & hoc uno de Nomine Periculo non vacat; ſi igitur hujus Mali Suſpicione careret Purgatio, illa potius adhibenda quam Venæ Sectio, cum Purgatio ejus loco cæteroquin eſſe poſſit. Sed Res e converſo ſe habet, Suſpicio enim ejus Mali a Miſſione Sanguinis eſt Suſpicio Rei poſſibilis, non tamen neceſſario prævenientis, aut neceſſario conjunctæ, cum qualibet Miſſione Sanguinis; in Purgatione autem neceſſarium ſemper eſt Sanguinem ſolvi a naturalibus Coheſionibus, ſeu recedere & dimoveri a ſua Compoſitione: In Purgatione igitur Periculum erit certum, in Venæ Sectione dubium; hoc eſt, erit Purgatio Venæ Sectione periculoſior, &c.* And there he goes on to ſhew how much more dangerous Purging is than Blood-letting. From this, and a great deal more he has there adduced, it is evident, 1. That violent Purges have a great deal of real Danger in them abſolutely, without reſpect to other Remedies; and indeed theſe unnatural Fermentations and Changes of the Coheſion of the Fluids, inſtead of promoting the Cure, often increaſe the Cauſe of Fevers, to wit, the Obſtruction of the *Arteries* which conſtitute the *Glands*. 2. That violent Purges are reſpectively much more dangerous than Blood-letting; wherefore this laſt is a more ſafe, and conſequently a more uſeful, Expedient in the Cure of Fevers than the former. And I ſay, 3. That violent Purges are a much more dangerous Remedy in Fevers than Vomitings are; for Vomits extend no further than the *Primæ Viæ*, where the Canals are ſtrong and wide, the Fluid viſcid and groſs; but violent Purges reach all the ſlender Veſſels and noble Liquors of the Body, where the Danger of any conſiderable Alteration is extremely great: Wherefore upon this Account, I ſay that the Danger of violent Purges is to that of Vomiting, as the Length of the Canals of the whole Circuit of the Blood is to the Length of the Canals of the *Primæ Viæ*. And how much longer the firſt is than the latter, I leave the Reader to conſider. Beſides all theſe, there are ſo many other known and evident Dangers in violent Purges, that the only Part of Purging which is ſafe (in curing Fevers) is *Gliſtering*, or the *Lotiones Alvi*; or rather than either of theſe, only that gentle Purge which is the Concomitant of every plentiful Vomiting.

4. We are come now to the laſt proper Remedy of Fevers, which was, the *Medicaments which increaſe the leſs ſenſible Evacuations*. But all that can be pertinently ſaid on this Head, is ſo learnedly and accurately already handled in a Treatiſe, Entitled, *Archibaldi Pitcarnii Diſſertatio de Curatione Febrium quæ per Evacuationes inſtituitur*, that thither I ſhall

ſhall refer the Reader, only adding the Reaſon why ſuch Medicaments (adminiſtred in the Beginning of Fevers) do rather increaſe than cure them, which is this: In an Obſtruction of the *Glands*, the Blood in the complicated *Arteries* which conſtitute the ſame, ſtagnates up to the next Branching thereof, neareſt the Heart, and thereby a conſiderable Length of it becomes obſtructed and unpaſſable. The only Way this Obſtruction can be removed is by the Force of the Blood, which (in every Pulſe or Contraction of the Heart) waſhes off a Particle of the ſame, till the whole be digg'd away; as ſhall be ſhown. Now the *Arteries* which conſtitute the *Glands*, whereby the inſenſible Evacuations are naturally ſecern'd, being in the Beginning of the Fever ſo much obſtructed, it is ſimply impoſſible for ſuch Medicaments to carry theſe Obſtructions off as they are juſt now: They muſt rather force through the ſuperficial *Arteries*, and theſe few other *Glands* that are (perhaps) left paſſable, the natural Humidity only, *i. e.* the thinneſt Parts of the Blood, and conſequently make it more viſcid, and thereby the Obſtruction more firm, *i. e.* will increaſe the Fever; whereas when a great deal of theſe Obſtructions in the *Arteries* are waſh'd away by the Force of the Blood, *i. e.* in or near the Decline of theſe Fevers, ſuch Medicaments will be able to force the ſmall Remainder of theſe Obſtructions, either through the Orifice of the *Gland*, or into the continued *Vein*, till by frequent Circulations it be either loſt, or thrown out of the Body.

From all that has hitherto been ſaid about the Cure of theſe Fevers, it is evident,

COROLLARIA.

1. THAT the firſt Thing incumbent upon a Phyſician in the Caſe of theſe Fevers, is to let a conſiderable Quantity of Blood, both in order to remove the Cauſe of theſe Fevers, and to prevent the Inconveniencies of the ſubſequent Vomiting. *Bellini*, in *Prop.* 5 & 6, *de Febribus*, has demonſtrated, that *Vena in omni Morbo eſt ſecanda, in quo minuenda Quantitas, aut augenda Velocitas, aut refrigerandum aut humectandum, aut aliquid adherens Vaſis dimovendum aut abripiendum*; than which there could be nothing more pat to our Theory.

2. The ſecond Step in the Cure of theſe Fevers is Vomiting; for it at leaſt removes the Obſtructions of the *Stomach* and *Inteſtines*, and goes a great Length to take away the Obſtructions of moſt of the other *Glands* likewiſe. This eſpecially obtains in Fevers occaſioned by Intemperance or Cold; as is evident from what we have ſaid about Vomiting. But as for Purging in Fevers, there is very little more ſafe than what is the neceſſary Concomitant of all ſuch Vomitings.

3. The laſt, but moſt univerſal and ſureſt Step, is the increaſing the leſs ſenſible Evacuations: But this muſt be uſed only in the Decline of theſe Fevers; as has been juſt now ſhown.

I have in this Place only determined the Order, and the ſeveral Degrees of the Efficacy, of theſe Remedies (in the Cure of Fevers) with reſpect to one another; their Kinds and Quantities being to be adjuſted by a former Analogy I have given, when I was ſpeaking about the Advantages of Vomiting.

But here it may be very fairly asked, Why (ſince I make the Obſtructions of the *Artery* and *Nerve* which conſtitute the *Glands* the principal Cauſe of Fevers) do not I allow Mercurial Medicines (which all grant to be one of the moſt proper, and perhaps *ſpecifick*, Remedies of Obſtructions) to be one of the Steps of the Cure of theſe Fevers?

Before I anſwer this Queſtion, I ſhall, 1. Explain the Nature of Mercury; 2. I ſhall ſhew the Manner of the Operation of theſe Medicines; 3. The Advantages and Uſefulneſs of them.

I. *As to the firſt I ſuppoſe,*

1. That pure Mercury or Quickſilver conſiſts of Parts (I mean thoſe of the firſt Compoſition, by which I underſtand an Aggregate of the ſmalleſt and laſt conſtituent Particles of any Body, and an Aggregate of theſe Aggregates I call of the ſecond Compoſition; and ſo on) exceedingly ſmall, equal, and perfectly ſpherical.

This has been ſuppos'd by all who have written any Thing tolerable about the Nature of this Mineral. It is true indeed, ſome have ſuppos'd it ſo, becauſe they ſaw that di-

viding Mercury upon a Plane (even by e Aſſiſtance of a Microſcope) ſtill the up- r Part retained its Sphericity, which they uld not ſo eaſily obſerve in other Fluids: t the true Reaſon of this is, the great avity of the Mercury, in reſpect of other uids, and the uniform Preſſure of the Me- um; for all Fluids will retain their Sphe- ity, till their Quantity be ſo diminiſh'd ther by their being another heterogeneous cifically lighter Body included in them, by their Gravity decreaſing at a greater te than their Surfaces) that they are of al Gravity with an equal Portion of the dium they are in, and then they will re- e any Figure the Motion of the Medium imprint on them. However, the Divi- s of Mercury muſt be very ſmall before can be reduced to this State; but that it at laſt be brought to it, is evident from mixing and pounding of Quickſilver ng common Water, in which we know art of the Quickſilver is loſt, by the Di- ution of its Weight, and the Diſco- ing and Effects of this Water.

ut the true Reaſon why the former Sup- ion is to be made, is, becauſe from it e of the *Phænomena* of Mercury may be unted for.

or from thence it is evident, why Mer- (though the heavieſt known Fluid) with fewer Degrees of Heat in an Alem- than any other. 1. Its Parts (of the Compoſition) being exceedingly ſmall, ſmaller than ſuch Parts of any other , it muſt riſe ſooner than they; be- the Gravity of its Particles has a leſſer ortion to their Surfaces, than the Gra- of the Particles of any other Fluid has eir Surfaces; for the Gravities of Bo- decreaſe in a triplicate Proportion, where- ir Surfaces decreaſe only in a duplicate Thus ſuppoſing (for Example) the eter of a Particle of Mercury (of the Compoſition) to be to the Diameter of icle of Water (of the ſame Compoſi- as 2 to 300, (and we may juſtly ſup- he Odds infinitely greater) their Sur- will be as 4 to 90000; and their Soli- *i. e.* their Gravities, as 8 to 27000000. pon Suppoſition their ſpecifick Gravi- ere equal; but ſuppoſing (at the) the ſpecifick Gravity of Mercury to that of Water as 15 to 1, the real Gravities of ſuch Particles will be to one another as 120 to 27000000: Whence it is evident, that not only the *Ratio* of 8 to 4, or 2 to 1, but likewiſe the *Ratio* of 120 to 4, or 30 to 1, is much leſs than that of 27000000 to 90000, or 300 to 1. And therefore upon ſuch Suppoſition it will follow, that the Gravities of ſuch Particles of Mercury would be much leſs than that of ſuch Particles of Water; and that the Surfaces of theſe Particles of Mercury would be much larger, in reſpect of their Gravities, than that of the like Particles of Water, in reſpect of their Gravities; and conſequently the Mercury would riſe in the Alembick with much fewer Degrees of Heat than the Water upon this Account. But, 2. The Particles of Mercury are perfectly ſpherical and equal; (for all homogeneous Bodies muſt conſiſt of Particles *ſimiles & æquales* in the *Euclidean Senſe*; *vide Def.* 1. 6, & 9, 11 *Euclid.*) and conſequently can only touch in Points, and thereby their Sublimation will become more eaſy. A Sphere can be touch'd but by 12 other equal Spheres, and that too but in ſo many Points; and if we ſuppoſe the ſuperficial Particles of the Mercury to be firſt rais'd in the Alembick, they can be touch'd only by 9 other. Now the Force and Value of ſuch a Contact as this of 9 Points, is leſs (*cæteris Paribus*) than that of other ſolid Bodies generated by the Circumrotation of whatever Figures, regular or irregular, right-lined or curve-lined; for the Contacts of Circles are the Meaſure of the Contacts of all other Figures whatſoever; and tho' in ſome Curves their Contacts in ſome Points may be leſs than that of Circles, (*vide Scholium Lem.* 11. *Princip. Phil. Mathem. Newtoni*) yet in all their other Points they will be proportionally greater, and conſequently the Value of the whole Contacts greater than that of Circles: Wherefore it is evident, that ſpherical Bodies will be more eaſily ſeparated than any other, and conſequently will riſe in the Alembick with fewer Degrees of Heat than any other. *I ſuppoſe*,

2. That the only Effect of the Sublimations, and other Preparations of Mercury, is the dividing it into theſe Parts of the firſt Compoſition, which are ſpherical *per Suppoſ.* 1; or into Parts of a more complicated Com-

Compoſition, which (by reaſon of the vaſt Gravity of Mercury, in reſpect of other Fluids, and the uniform Preſſure of the *Medium*) may be ſtill ſpherical; for if the Mercury be pure, and no heterogeneous lighter Body be mix'd with it, it will ſtill retain its Sphericity, till the *Ratio* of the Surface of a Particle of Mercury to its Gravity, be to the *Ratio* of the Surface of a Particle of Air to its Gravity, as is the ſpecifick Gravity of Mercury to the ſpecifick Gravity of the Air, *i. e.* (putting the ſpecifick Gravity of Mercury to that of Air as m to n, and the Diameter of a Particle of Mercury x, and that of a Particle of Air a.) till $m . n :: \frac{1}{x} . \frac{1}{a}$, then x will be equal to $\frac{n\,a}{m}$, that is, (ſuppoſing a equal to Unity as the Standard, m to n, as 10800 to 1 *proxime*, as all know) the Diameter of a Particle of Mercury muſt be 10800 times leſs than that of a Particle of Air, or the Particles of Mercury themſelves 125971200000 times leſs than theſe of Air, before they loſe their Sphericity. Now beſides theſe Diviſions into ſpherical Particles, the ſaline Bodies, which are mix'd with the Mercury in theſe Preparations, keep theſe aſunder and disjoined, like ſo many congeal'd little Bullets ſeparated by the Fixation of ſome Liquor. This is (as I ſuppoſe) the whole Effect of theſe Preparations; as is evident from what Mr. *Boyle* and all other *Chymiſts* have found, to wit, that from all the Tranſmutations and Preparations of Mercury they could elicit the ſame uniform heavy Fluid; which could never happen, if there were any other (beſides the now mentioned) Effect produced by theſe Preparations; for by what Means ſoever you diſſolve this congeal'd Separation, the greater Gravity of Mercury brings its Particles into their former Union, and thereby reduces them into the ſame Fluid, Quickſilver. Beſides theſe two Suppoſitions, it is to be obſerv'd,

1. That the chief Ingredients in Mercurial Preparations are (beſides it ſelf) Common and Armoniack Salts, and their Spirits; the Spirit and Oil of *Nitre*; *Vitriol*, and its Spirit; and the like; (which afterward we ſhall call by the general Name of *Saline Bodies*) all which (we know) are endued with a vaſt Power to vellicate and ſtimulate the more ſenſible Parts of Animal Bodies, and (conſequently) to produce Vomitings and Purging (of themſelves) according to their Quantity, and the Degrees of their natural Force.

2. That the only Effect of repeated Sublimations in theſe Preparations, is the Diviſion of the Mercury into ſmaller and ſmaller Particles, and the freeing of theſe from the groſſer and more noxious Parts of theſe *Saline Bodies*; for Mercury ſublimating more quickly and eaſily than theſe other Saline *Bodies*, muſt in repeated Sublimations have a greater Proportion to the *Saline* Mixture than in the firſt Sublimations; and conſequently the ſubſequent Sublimations muſt have more of thoſe *Saline Bodies* than the *antecedent*, whereby the Preparation will become ſweeter and leſs vellicating. This is evident from the *Aquila alba*, & *Panacea Mercurialis*, which are all much heavier (ſpecifically) than other Preparations of Mercury.

Theſe Things premis'd, I come to explain,

II. The Manner of the Operation of Mercurial Medicines; in performing which I diſtinguiſh two Caſes. 1. Either the Medicine is taken inwardly: Or, 2. It is applied outwardly; under which Head I comprehend both Mercurial Inunctions and Plaiſterings. As to the firſt, after the Medicine is taken by the Mouth, it deſcends into the Stomach, and there the Saline Parts of the Compoſition vellicate the *Fibres* thereof, which occaſion the Gripes are felt upon taking theſe Medicines; and if the Saline Particles have a conſiderable Share in the Compoſition, they ſo powerfully ſtimulate the *Fibres* of the Stomach, as to bring on to theſe Contractions which produce Vomiting; as has been formerly explain'd. The Mercury it ſelf, with ſome of the Remainder of the Saline Particles, ſlipping into the *Inteſtines*, do likewiſe vellicate theſe, and occaſion a gentle Purge; which Effect, though it be conſtant, (in the firſt Days after the uſe of theſe Medicines) yet it is never ſo violent as that of other Purgatives, becauſe much of its Force is ſpent in the Stomach. So that both the Vomiting and Purging produced by theſe Medicines are owing

line Parts of the Compoſition, is evident
in the Nature of Mercury, and the Effect
oduced in it by the Chymical Preparations
ereof, juſt now explained; for Mercury
nſiſting of ſpherical Particles, and by ſuch
eparations being only divided into theſe,
themſelves (as being ſpherical) theſe Par-
les could never occaſion the Stimulations,
hich (as has been formerly ſhown) are ne-
ſary to produce theſe Effects. The only
ing they can contribute towards them is,
t by their exceſſive Gravity and Smallneſs
y are capable to diſſolve the Coheſion of
more viſcous Fluids of the *Stomach* and
eſtines, and conſequently make them flow
re eaſily, when the *muſcular Fibres* of
ſe Parts are otherwiſe brought into Con-
ctions. Beſides, we ſee that the fore-
ntioned Effects are moſtly produced by
ſe Compoſitions in which moſt of theſe
ine Bodies enter, as in the Corroſive Sub-
ate, the White and Yellow Precipitate:
t in the others which paſs many Sublima-
ns, (as the Sweet Sublimate, and the *Pa-
ea Mercurialis*) we judge of their Good-
s as they produce leaſt of theſe Effects. I
ribe the Sweating produced by a Doſe of
e of theſe Compoſitions, partly to the
olence of the Vomiting, and partly to
Saline Particles which enter the Compo-
on; and that ſmall Salivation, to the
nediate Action of theſe *Saline Bodies* upon
Salivary Glands, and not to the Mercury
elf. All theſe will be evident to any
o have ſeen the ſudden Effects of theſe
dicines, which have not had ſufficient
e either to enter or circulate with the
od, ſo as to be able to produce the men-
ed *Sweating* or *Salivation* after the ordina-
Manner. Thus I have endeavoured to
ain the Effects of theſe Medicines while
are in the *Primæ Viæ*. I ſhall now
w the Manner of their Operation in pro-
ing a *Flux de Bouche*, that thereby the
Effects of this Kind may be under-
d.

he Mercury being freed (by the Action
he *Stomach*, and the Heat of the Liquors
ained in the ſame and in the *Inteſtines*)
noſt of the Saline Part of the Compoſi-
enters the Blood by the *Lacteals*, and
th it carried about through the Canals,
where either it, or any Liquor of the Body generated by it, flows, (the ſmall Remainder of theſe Saline Particles, which adheres to the Mercury after the Action of the *Stomach* and *Inteſtines*, aſſiſting the Propagation of the Motion, by the vellicating the Sides of the Canals:) And having the ſame Celerity, but a much greater Weight, it has conſequently a greater Force, and produces a ſtronger *Ictus*, and thereby (when once any conſiderable Quantity thereof has enter'd the Blood) it (by its great Force and the Smallneſs of its Particles) diſſolves the unnatural Coheſions of all the Liquors, renders them more fluid and active, and likewiſe digs out all the Obſtructions of the impaſſable Canals, like ſo many little Bullets ſhot againſt a Mud Wall; every little Bullet breaks down a Part, till the whole be levelled: And this it is the more able to perform, both becauſe it is exceeding weighty, and makes therefore a greater and more forcible *Ictus*, and becauſe its Particles are exceeding ſmall, and are therefore to be conſider'd as ſo many exceeding ſharp Wedges, or *Cunei*. Beſides, by the Smallneſs of its Particles, it is able to enter into theſe ſlender Canals in which the Blood cannot freely paſs, and thereby to ſcour all the Paſſages, be they never ſo ſmall. And that there are Canals through which the Globules of the Blood cannot freely paſs, we are convinced from Microſcopial Experiments. Thus all the Liquors of the Body being attenuated, and conſequently their Celerity and Force render'd greater, and all the Canals ſcoured and render'd paſſable, the whole *Glands* of the Body are ſet at work, and throw out the more noxious and leſs fluid Parts of their Liquors, (by reaſon the Particles of the Mercury either diſſolve or carry before them all the groſs Particles which reſiſt them) and thereby the Perſpiration, Urine, Salivation, are increas'd, the Quantity of the Fluids leſſen'd, and the whole Body emaciated, till there be nothing left but pure and uſeful Liquors, and clear and paſſable Canals. Thoſe who can only be convinced by ocular Demonſtration, may ſee a Kind thereof in *Phil. Tranſ.* for *Jan.* 1700, where *Leeuwenhoeck*, from Microſcopial Experiments on *Tad-poles*, confirms the main of this Doctrine

as to the Manner of the taking away Obſtructions.

But there is another Effect of Mercurial Medicines, which is no ways to be forgotten; for beſides theſe mentioned Effects, it deſtroys that corroſive Faculty of the Liquors, which burſts the ſuperficial Veſſels, and produces theſe conſtant Pains, Scabs, Ulcers, and the like, which we feel: For, ſuppoſing an Obſtruction in any Veſſel (either by the Corroſiveneſs or Viſcidity of the Liquor, or from ſome extrinſick Cauſe) the Liquor ſtagnates and coagulates there, and by the Force of the fluent Part of that Liquor, and by the Corroſiveneſs of the ſtagnated Part, the Veſſels are miſerably diſtended, and their Parts dilacerated, which occaſions conſtant Pain in that Part, or they burſt, and the Liquor putrifying, occaſions a Botch, Scab, or Ulcer, more or leſs dangerous and painful, as the Corroſiveneſs of the ſtagnated and putrifying Fluid is greater or leſſer. Now this corroſive Faculty muſt proceed from the Pointedneſs of the Particles (perhaps theſe Particles may conſiſt of four equilateral triangled Plains, for ſuch have the greateſt equal Degree of Acuteneſs on all their Points, which ſeems neceſſary to make them equable in their Actions, and homogeneous in their Natures) of the ſtagnated Fluid. Now the Mercury will not only remove the Obſtruction, and make the Veſſel paſſable by its Weight, but likewiſe by the ſame will break off and plain the Points and Angles of theſe Particles, and ſo render them harmleſs and innocent; for *ſublata Cauſa, &c.*

But here it may be objected, That the grand Effect (as moſt People believe) of Mercurial Medicines is Salivation, and that really the *Salivary Glands* ſecern more of their Fluid proportionally than any other, yea than moſt other *Glands* of the Body, which is contrary to the 5th *Prop.* about Secretion. To this I anſwer,

1. That the principal Effect of Mercury, is the attenuating the Fluids, the clearing the Canals, and the deſtroying the Corroſiveneſs of the Obſtructions; and that Salivation has no more Title to be the principal Effect of Mercury, than inſenſible Perſpiration; for all the *Glands* (notwithſtanding the Objection) ſecrete their reſpective Liquors in the Proportion mentioned in the 5th *Prop.* about Secretion. 2. It is evident that Salivation is not the main Effect of Mercury from this, that many Perſons are cured of very dangerous Poxes, Ulcers, and Rheumatiſms, without ever ſalivating, at leaſt at the ordinary Rate of Salivation. But, 3. The Reaſons why we ſeem to ſecern more by the *Salivary Glands* proportionally than by any or moſt others, are theſe: 1. The *Salivary Glands* are more in Number than any of theſe which ſeparate viſible Fluids, and conſequently it is but reaſonable they ſhould ſecern more than any other. It is true, the *Glands* of inſenſible Perſpiration are more in Number than thoſe, and it is not to be doubted but they ſecern more likewiſe; and it will be found ſo, whenever the Thing is examined after *Sanctorius*'s Method; but that Secretion not being viſible, makes the Matter doubted. 2. The Canals which conſtitute the *Glands* of Salivation are evidently wider than theſe of others, as is clear from their ſpongy and ſoft Contexture, and ſo it is very accountable from the mentioned *Prop.* why they ſecern more plentifully. 3. The Fluid ſecern'd in the *Salivary Glands* is ropy and viſcid, and one Part draws forward another, which does not happen in moſt other *Glands*; and upon this Account it is no Wonder that thoſe ſecern more than theſe. 4. The *Salivary Glands* in ſome People have not ſo good a Contexture, and ſo obvious a Courſe, as in others: And this is the Reaſon why ſome ſalivate little or none, and others too much. But, 5. The true Account of the Matter is this: The Saliva being a tough ropy Subſtance, cannot be thruſt out ſo faſt as the Mercury carries it forward, eſpecially ſeeing it ſeparates on the moſt glutinous Parts of this Saliva, whence all the *Salivary Glands* begin to ſwell, until there be ſuch a Quantity accumulated as, together with the Force of the Mercury and of the ſucceeding Fluid, is able to burſt the Orifices of the *Glands*: And it is obſervable, the Salivation continues only ſo long as any of the *Glands* are found ſwelled. Whence it is evident, that this plentiful Salivation depends upon this, That the Fluid is as it were laid up in Store to be dem-

re plentifully afterwards; whereas in the
er *Glands*, the Fluid being thinner, is
rn'd as faſt as it is driven forward: And
ce it comes to paſs, that we think the
va ſecern'd is much greater in Quantity
n what is derived from the other *Glands*.
we take in all theſe Conſiderations toge-
, they will account for the plentiful Sa-
tion by Mercury.

. As to the ſecond Caſe: In Mercurial
nctions, the viſcid Matter, in which
Quickſilver is wrought and pounded,
es only to keep the ſmall Particles there-
ſeparated and aſunder, and to apply them
he Skin, till by frequent rough Frictions
ſmalleſt Particles of the Mercury are
ed through the Sides of the cuticular
eries into the Blood, and when once they
got thither, they are in the Eſtate juſt
mentioned, and operate after the Man-
already explained. And indeed this were
ſhorteſt and eaſieſt Courſe of raiſing a
de Bouche, if Mercury could be ad-
d to the Strength and Conſtitution of
Patient (for the Quantity of Mercury,
h will kill one, will not produce the
n'd Effect of Salivation in another) by
Method, as exactly as by adminiſtring it
ually in Doſes by the Mouth. But it
ot be done ſo, and therefore the latter
rſe is the more ſafe.

ercurial Plaiſters, applied outwardly to
Scabs, or inveterate Ulcers, operate
: The corroſive ſaline Mixture (if there
ny Part thereof in the Compoſition)
away and corrodes the putrid Matter,
h ſears up the Mouths of the Veſſels;
at the Mercurial Particles get eaſily in-
em, where they both clear the Veſſels
e Obſtructions, and deſtroy the Pointed-
of the Particles of the Fluid, which
Things did concur to make the Ulcer
re. If there be no ſaline Body in the
ication, then the Mercury muſt be forc'd
riction into the Maſs of the Blood, to
ce the deſign'd Effect.

us from a few eaſy and evident *Poſtula-*
have given an intelligible Account of
Manner of the Operation, and of the
s of Mercurial Medicines, when the
ry enters in any Quantity into the
of the Blood; and from thence it will
be eaſily underſtood, that when the Quantity is leſs, the Effects will be proportionally leſſer, ſo that it will be needleſs to explain all the ſeveral Degrees thereof by Detail. But ſeeing it is evident from *Leeuwenhoeck*'s Obſervations in the laſt mentioned *Phil. Tranſ.* that the Force of the Blood is able to waſh away ſome Obſtructions, let us take a groſs Eſtimate of the Proportion of the Efficacy of the Blood aſſiſted by Mercury, to the Efficacy of the Blood of it ſelf and unaſſiſted, to take away Obſtructions.

1. Then we muſt conſider, if (inſtead of the ordinary Liquors) there paſs'd nothing but Mercury in the Canals of the Body, the Weight of Blood being to that of Mercury as 1032 to 14593, or as 1 to 13 at leaſt, and their Velocities being the ſame, Mercury would at leaſt be 13 times more able to remove the Obſtruction than the Blood of it ſelf: But it is certain (if the Obſtruction renders the Canal impaſſable) there can no Particle of the Mercury get away; and when there is any Quantity thereof got into the Blood, there are ſtill ſome new Particles of it coming up, ſo that after ſome Time (they having a greater *Momentum* than the *Globules* of the Blood, and thereby getting through it up to the Obſtruction) we may conſider there will be little or nothing ſave Mercurial Particles at or near the Obſtruction, driven againſt it by the whole Force of the Blood; ſo that, as to the Obſtruction it ſelf, it is very near the ſame as if the whole Canals run Mercury. However, let us take the Proportion only as 1 to 10; ſo that upon this Account the Blood, aſſiſted by any conſiderable Quantity of Mercury, will be 10 times more able to remove the Obſtruction than the Blood unaſſiſted.

2. Let us conſider, the *Globules* of the Blood are elaſtick, (for they often loſe their Figure in ſtraight Canals, and recover it again, as *Leeuwenhoeck* has ſhown, which is the Definition of Elaſticity) and theſe of Mercury are not, or very little ſo; and conſequently upon this Account, the Efficacy of the *Globules* of Blood will he hugely diminiſh'd. Let us ſuppoſe it loſes $\frac{1}{4}$ of its Efficacy (which is a liberal Allowance), and then the Proportion will be $\frac{3}{4}$ to 10, or 3 to 40.

3. Let us obſerve, that the *Globules* of the Blood and Mercury driven againſt the Obſtruction, and at every Pulſe digging away a Part of the ſame, may be conſider'd as *Cunei.* Now *(cæteris Paribus)* the Force or Efficacy of *Cunei* is reciprocally proportional to the Angles their Edges make: But in Spheres, the leſſer or greater Degree of Curvity is to be conſider'd as theſe Angles, when theſe Spheres are conſider'd as *Cunei*; and the Degrees of Curvity in Spheres (as in Circles) are reciprocally as their *Radii.* Suppoſing then the Diameter or *Radius* of a Particle of Mercury is to that of a *Globule* of Blood as 1 to 100, (and there can be Reaſons given, ſome of which I have formerly hinted, why the Odds may be ſuppos'd much greater) then the Force of the Mercury and the Blood, to that of the Blood unaſſiſted, to remove Obſtructions, will be as 4000 to 3. Laſtly, Let us conſider, that by the Force of the Mercury the Liquors of the Body are exceedingly attenuated and render'd more moveable, and are thereby capacitated to receive a ſtronger Impreſſion, ſo that they both move more quickly and with greater Force; as is evident from the Pulſe of thoſe who are under a *Flux de Bouche*, whoſe Pulſe is little leſs frequent and ſtrong than the Pulſe of thoſe in a Fever. Let us ſuppoſe the Proportion, both of the Frequency of their Pulſe, and of its Strength, to that of an ordinary one as 3 to 2, (and this is certainly much leſs than the Truth) then it will be as 3 to 2 upon the Account of its greater Force, and again as 3 to 2 upon the Account of its greater Frequency, that is, as 9 to 4; ſo that now upon this laſt, and all the former Accounts, the Proportion of the Efficacy of the Blood, aſſiſted by any conſiderable Quantity of Mercury, to that of the Blood unaſſiſted, to remove an Obſtruction, will be as 36000 to 12, or as 3000 to 1; ſo that the firſt will be 3000 times more effectual for that End than the latter. But if any ſhould ſtill think we have made too liberal Allowances for the Mercury, let us rebate the Proportion one third Part; yet ſtill the Blood, aſſiſted by any conſiderable Quantity of Mercury, will be able to do as much toward the Removal of an Obſtruction in one Day, as the Blood unaſſiſted in three Years almoſt.

Beſides, there are a great many Caſes, in which the Blood unaſſiſted is ſo far from being able to remove the Obſtruction, that it will continually increaſe the ſame: For the Obſtruction proceed from a Depravation of the Liquors of the Body, as in *Rheumatiſms*; or if ſome corroding Matter be forced into the Liquors, ſo as to be able to vitiate the ſame, as in Poxes, Peſts and Poiſons, it is demonſtrable, that (without ſome external Aſſiſtance, either by Diet or Medicine) the Malady, inſtead of mending by Length of Time, will increaſe. But if the Obſtruction proceeds from ſome external Injury, as in Bruiſes, Wounds, Colds, and (perhaps all Continued) Fevers, the Liquors (ſtill perſiſting in their natural and whole ſome State) may do much to drive away the ſame by Length of Time; but ſtill ſooner, and more ſafely, if they be aſſiſted by convenient Medicines. I come to,

III. The Advantage and Uſefulneſs of Mercurial Medicines.

And, 1. They are uſeful for deſtroying the Viſcidity and Thickneſs, the Corroſiveneſs and Pointedneſs, of the Particles of the whole Liquors of the Body, rendering them fluid and moveable, innocent and harmleſs if before they were otherwiſe.

2. They are evidently uſeful for removing all Obſtructions, Ulcers, Scabs, Botches, Swellings, conſtant Pains, (all which are but the Effects of ſome Kind of Obſtruction or other) of whatever Nature or Kind, by adjuſting only their Quantities rightly; and that is the Work of an able Phyſician.

Now for Anſwer to the Queſtion which gave Occaſion to this Diſcourſe. Mercurial Medicines were exceedingly uſeful, and would anſwer the whole Deſign in curing Fevers, were it not upon theſe two Accounts. 1. Before they could be effectual for that Purpoſe, they behoov'd to be adminiſtred to a large Quantity, which never miſſes (by the Violence and Force of the Motion of the Blood thereby occaſioned) to induce a new Fever in the Patient of it ſelf; ſo that inſtead of curing the former Fever, it would double it, and make the Danger double

ich by no Means is to be done, the Pa- t having enough to do to wreſtle with But, 2. It requires ſo long Time to g the Effects of Mercurial Remedies to Height, that the Patient (in ſo long a e) would be cured by the Force of Na- , or kill'd by the Violence of the Diſeaſe; hat upon this Account they are render'd eſs. Beſides, there are a thouſand other nveniencies which render this Method s full Force altogether impracticable.

fter all, I mind to have been informed ne Time ago) by that Eminent Phyſician ur Country, (whom I have thrice al- y mentioned) That People who have ſeverely flux'd ſeldom fall into dan- us Fevers; and that in Fevers of Chil- occaſioned by Worms, Mercury (if reetly us'd) is always, and in ſome Fe- of People of riper Years is often, very eſsful; the Reaſons of both which are evident from our Doctrine.

or (in thoſe who have been ſeverely 'd) the Blood is ſo purified, and render'd luid, and all the Canals are ſo cleanſed ſcoured, that if at any Time there ld happen ſuch Obſtructions as occaſion Fevers, Nature is able in a ſhort Time to drive them away, ſeeing they muſt rather happen from ſome external Cauſe than from within, where all is clear and paſſable.

As for Fevers occaſion'd by Worms among the Fluids in the Bodies of young Perſons, (which by the way is an Argument omitted for our Theory of Continued Fevers, as is likewiſe the *Febris Variolarum*, both which are occaſion'd by Obſtructions, as is evident from the Botches which break out upon the latter, and as ſhall be juſt now ſhown of the former;) for here a little Worm being forced into ſome of the *Capillary Arteries*, where it can neither get back nor forward, totally occludes the Paſſage of the Blood, and thereby occaſions a Fever after the Manner already explained. Now the Reaſon why the natural Force of the Blood is not able to remove ſuch an Obſtruction is, becauſe a living Creature makes it, which will not be moulder'd away after the Manner of coagulated Blood; but will require the greater Weight and Force, the Mercury to kill it firſt, and then both the Mercury and Blood concurring, waſh it away.

An entire Hiſtory of all the Fluids that are contained in the Humane Body, as Chyle, Milk, *the* Semen Virile, Pancreatick *and* Biliary Juices, *the* Lochia, *and other Female Excretions*; Serum, Lympha, *the Humour of the* Pericardium, Saliva, Tears *or the Liquor flowing from the Eyes, the* Mucus *or* Snot *of the* Noſe, Ear-Wax, Urine, Sweat, *the Matter of* inſenſible Tranſpiration; *of* Spirits *called* Animal, Succus Nutritius, &c. *From* Verheyen, Bellini, D'Gagnon, Hecquet, *and other Modern Authors: And firſt of all from* Pitcarn's *Diſſertations.*

Of the Circulation *of the* Blood *by the ſmaller Veſſels, a Diſſertation publiſhed by* Archibald Pitcarn, M. D. *Profeſſor at* Leyden, *in the Year* 1693.

WE have been hitherto taught by the Divine *Harvey*, that the Blood circulated or was driven from the Heart through the Arteries, and that it return'd thither again by the Veins; and being contented with this Doctrine, which was received as the Faith of a Phyſician, they have let what remains to be diſcover'd lie in Darkneſs. But afterwards when this appear'd not ſufficient to anſwer the Intentions of Phyſick, Men began to diſpute, whether the Blood was poured out from the Arteries into other Parts of the Body, by which the Arteries and Veins might be diſpers'd into their opening Trunks; or from the ſmaller Arteries, that did not convey the groſs, but finer Blood, for the Nutrition of the Parts, which did not return again, and all the remaining Blood paſs'd by the larger Arteries that were united to the Veins by *Anaſtomoſes*. For, firſt of all, the great Part of the groſs or thick Blood, that is, ſuch as is contained in the larger Veſſels, is thrown into the Parts of the Body, or rather the Interſtices of the Parts. But, ſecondly, it ſends the thinner Part of the Blood, that is, the Part inclos'd in the ſmaller Arteries, ſaid for the Maintenance of the Parts, that is, it teaches a great Part of the Blood not to circulate but in the *Viſcera*, as they ſay, and ſo to ſtagnate and adhere to the Pores of the Parts. But when all the Blood is driven round by the Force of the Heart and the Arteries, ſo that by its Vigour the Blood cannot reſt, it is plain there can be no Stagnation in the ſmaller Veſſels; but by the conſtant Acceſſion of the Blood's Motion, that muſt be interrupted; or elſe the Blood not returning by the Veins, they muſt ſwell, which does not happen in a healthful Animal; and therefore it appears plain that there is no Adheſion in the Pores, from the Increaſe that conſtantly follows from the ſame Reaſon; for by how much the more is pour'd into the Pores, the eaſier it returns from the ſhutting up of the Vein from the Fluid that runs around it; as will hereafter be ſhown.

As Phyſicians appear greedy of Novelties, ſo they are too apt to be taken with every Sound;

ound; and when ſome have obſerv'd a ertain Kind of glandulous Fleſh collected ogether in ſeveral of the *Viſcera* ſurrounded ith all Sorts of Veſſels, they no longer oubt but that there are Glands in all thoſe, hich receive Blood from the Arteries, and ranſfuſe it into the Apertures of the Veins hat open betwixt the glandulous Body, hilſt that Diviſion ſecerning a ſufficient art, the Glands let it paſs thro' the Veſſel. ut this Opinion has nothing new in it, or it of any Uſe in Phyſick, but is a meer ound or Jingle of Words; for hence it on- happens that the Gland is call'd that *Me-ium* which they call'd ſometimes the firſt arts and Subſtance of the Body, ſometimes e *Anaſtomoſes*, which neither the Arteries Veins could properly receive the Name From hence alſo ariſes the ſame Incon- eniency; for when by this Means the Ar- eries and Veins were appointed to open in- o the Cavity of the Gland, a Part of the lood only can be ſwallow'd up from the ein; the reſt will be partly excern'd, and artly remain for the Increaſe and Nutrition the Parts, which will appear oppoſite to e Circulation, and be ſhown hereafter to falſe.

And ſince it is manifeſt, we ought to be that Opinion from whence may be awn the beſt Concluſions that may con- uce to the Uſe of Life, and not ſuch as ill furniſh us with the beſt Subject for iſputation; therefore what Phyſicians have rit in their Books concerning the Uſe of irculation in the Art of Phyſick is chiefly be regarded. In thoſe Books, many of em ſhow that they believ'd the Blood often w'd from the Mouths of the Hæmor- oide, Meſaraick, and other Veins; which ey cannot believe, who underſtand that e Blood always tends to the Heart from e Extremities of the Veins. But all Phy- ians that have laid down any Method, though they have believ'd the Circulation the Blood, have with one Conſent agreed d taught, that the Blood ſtop'd in the rts or the Glands; and becauſe the Blood, ether groſſer or finer, being detain'd in e Interſtices of the Parts, produced the me Symptoms which the Ancients allow'd, o were ignorant of Circulation; there- e the ſame Method of Cure propos'd by the Moderns is plainly agreeable to that of the Ancients, although never ſo diſconſonant to Experience, and the Laws of Circulation; from whence it is not to be admired that there is no greater Alteration in the Practice of Phyſick, ſince moſt Diſeaſes take their Riſe from a vitiated Circulation in the minuter Veſſels, which moſt of the Moderns ſeem to have underſtood no better than *Hippocrates* and *Galen*.

But although many Fluids are taken from the Blood, which are not reſtored to it again, and therefore not ſaid to be circulated; yet ſome Motion of them is neceſſarily conjoin'd with the Circulation of the Blood, ſo that they ſtop. This is either ſuddenly, or by Degrees, extinguiſh'd; for which Reaſon all Fluids which are driven from the Blood preſerve ſome conſtant Motion, although it be ſlow, towards the ſame Parts, as if preſs'd or ſqueez'd from the firſt flowing Blood towards them; from whence it follows, that thoſe who attribute no Motion, or at moſt only into ſome Parts, to the Fluids ſecreted from the Blood, either do not allow, or at leaſt do not underſtand, the Circulation of the Blood. Nor is it to be wonder'd at that ſome Phyſicians join with the Ancients, and though they allow Circulation, yet have not freed the Art from their Errors; for the Circulation of the Blood is not more neceſſary for the Conſervation of Life, than the Secretion of ſeveral Fluids therefrom, and the caſting of them into ſeveral Parts, the vicious Increaſe or Diminution of which Secretion is the great Cauſe from whence moſt Diſeaſes are derived; ſo that he that is in this Affair of the ſame Opinion with the Ancients, might as well think he can eſtabliſh Phyſick better by being ignorant of all the Effects of Circulation. There are a great many who have not believ'd *Harvey*'s Demonſtration, among whom *Willis* was eminent, who endeavour'd to try, if, by the Fame of his Learning, and the Praiſe of Philoſophy, he could overthrow the very Foundation of the Art of Phyſick; for his Books contain nothing but old Notions wrap'd up in new Terms; and whatever he boaſts, he endeavours to throw the Blood into every Part in an irregular or ſtraggling Way, and eſpecially the nervous Liquor, which wanders backwards and forwards

forwards as it pleaſeth. Thus we may ſee in his *Pathology* of the Brain, Convulſive Diſeaſes, and *Pharmaceutia rationalis*, the Animal Spirits, in the *Vertigo*, *Epilepſy*, and convulſive Motions, coming out or iſſuing by the Pores and Interſtices backwards and forwards, as if he was forgetful of, or ſlighted, the Structure of the Brain, and the Laws of Circulation. In ſome other Diſeaſes, the Animal Spirits were drowſy, and naturally inclined to Sleeping. Sometimes he aſſigns Perception to them, and always what was contrary to the Circulation of Liquors in an Animal.

But to avoid theſe Errors, ſome of the more ſagacious Phyſicians would have it, that all the Blood is percolated through the Glands, and Part of it returns into the Veins, the Remainder is ſent away into a ſecerning Veſſel out of the Glands. And ſome others, that they might propoſe a ſafe Way, have form'd to themſelves ſeveral Roads of paſſing it off. Thoſe who magnify the chymical Art, aſſign to every Gland a certain Liquor, which is wonderful in its Operation, under the Name of a Ferment; that is, ſome Fluid Parts that ſubſide from the firſt made Blood into Places agreeable to their Texture, in which, to wit, by a hidden Power or Virtue, that is, they are ſupported by their own Congruity. The Force of this Ferment is ſuch, that the Blood, or Part of it, is chang'd into a Fluid of another Texture, ſuch as is obſerved to be produced from that Gland, or the like Congeries of Glands: So, for Example, Part of the Blood brought to the Glands of the Liver, by an epatick Energy, and from an innate Ferment, lodg'd in the Glands of the Liver, is ſoon taught to change into meer Bile. This Opinion obliges the fermenting Liquors to adhere to ſome of the Parts, and therefore allows no Circulation of the fermented Maſs.

Yet thoſe are to be wonder'd at who can believe, that the Buſineſs of Secretion can be performed only by the Help of Ferments; for tho' that Opinion may not be contrary to the Circulation of the Blood, that admits that all Liquids contained in the Animal are either mov'd round or in ſome direct Motion, and that no Reſt or Stagnation is allowed to any Fluid; yet, beſides the Force of the Ferment, other Things are to be admitted to eſtabliſh Secretion, that is, to preſerve and maintain the Circulation of the Blood; which yet further demonſtrates the Utility and Impoſſibility of Ferment, as will be preſently ſhewn. But thoſe who embrace this Opinion, tho' they acknowledge the Circulation of the Blood in Words, yet they deny it in Effect.

They are refuted after the ſame Manner who aſſign the Bile to be ſecerned in the Kernels of the Liver: We ſee the Sediment of the Urine cannot adjoin it ſelf to the Glands of the Liver; as, for Example, Filtering once dip'd in Oil will not give Paſſage to Water, or being firſt dip'd in Water will not let Oil paſs through it.

And though thoſe chymical Ferments are not to be deſpiſed, yet the mechanical and philoſophical Opinions lately received are more conſonant to Reaſon, and aſſiſt us better to explain the Nature of ſecerning that Fluid called Blood; ſince it is granted by all, that Animal Blood is compoſed of many mix'd Fluids, and that every one of thoſe Fluids are formed of ſimilar or like Particles, if homogeneous, but yet of a different Figure or Size; but if heterogeneous, the Maſs includes Particles of various Figures and Sizes: And all this Buſineſs is illuſtrated in the Example of a *Sieve*, that lets through it one Kind of Grain or Seed, and will not let another paſs, though leſs, becauſe of another Figure; and alſo by that of a Colander or Strainer, that is pervious to ſome Fluids, and denies Paſſage to others much thinner.

Since then we are compoſed of Canals of divers Kinds, carrying various Sorts of Liquors in them, theſe Canals are made of certain and determinate Fibres, of ſuch a Number, compos'd of ſuch Tunicles, have ſuch Compactneſs, Elaſticity and Figure, and are of divers Proportions, from whence they receive different Names, as Arteries, Veins, Nerves, Fibres, Veſicles, Lympheducts, Bones, and Liquors of a like Determination, whoſe Parts have ſuch a Degree of Fluidity, that they can eaſily be turn'd about, and with ſmall Force mutually move and be removed by one another.

He that diligently conſiders how great a Part of our Blood is more ſubtil, or rather more fluid, than Water; I need not ſay watery indeed, tho' Water, or whatever is of

of an aqueous Fluidity and Weight, can eaſily be rarefy'd by a moderate Heat, be diſpers'd into the minuteſt Parts: Or if any look but into the Nature of a Fluid, he ought not raſhly to deny, that the Blood flowing through our Veſſels can be, by the Force of the Heart's Motion, driven and divided into much leſſer Parts, tho' it be a Fluid of the ſame Nature, and perhaps compoſed of other heterogeneous Fluids; but he ought to think that every Fluid is made up of an infinite Smallneſs of Parts, which yet in one Fluid and another has a different Force; ſo that they are not the ſmalleſt Solids of the Fluids that are ſecern'd in the Veſſels and Glands, (for we do not think there is any ſuch forcible Motion derived from the Heart and Arteries, that it can ſeperate the ſmalleſt Parts that compoſe the ſmalleſt Fluid from all Commerce with the reſt, otherwiſe we might obſerve the moſt volatile Salts freely diſcharged thro' the largeſt Arteries before the Blood) but the very Fluid it ſelf, tho' ſometimes in a ſmall Portion. And it is evident the Fluids do not take upon them any one proper and conſtant Figure, ſince they accommodate themſelves to every Figure, and enter any Orifice; from whence it follows, that if the Fluids are ſecern'd from Animal Blood in a fluid State, there is no Need for a particular Figure of the Orifice receiving it, but every one ſuffices that is ſufficiently large, neither are the Figures of the ſmalleſt Parts of the Fluid of any Moment towards the performing of Secretion.

But they are not the Fluids that are ſecern'd in the Glands from the Fluid Blood, but the leaſt Solids that are agglomerated and maſs'd together again, and form the ſmalleſt Veſſels, being ſecern'd in the Parts, take up the collected Bodies into a large Fluid. We ought to ſee what muſt be allowed to do this; namely, it ought to be remark'd, that in the ſecerning Veſſels, the Mouth of the given or propoſed Figure may receive, and alſo admit, a Corpuſcle of a given Figure. It ought to be allowed, that the propoſed Corpuſcles, and the Section of the collected Body to the propoſed Orifice, by a plain Parallel from the Orifice, be like and equal to the Figure of the given Orifice; to wit, that if a triangular Orifice only receive a ſolid Cone, the Triangle ought by the Axis of the given Cone to be like and equal to the Triangle comprehending the given Orifice; and that a quadrate Orifice: Admit only that of Salt for Example, the Cubick Particle ought not to be broader than that of the Cube, but equal to the Orifice; but that an Orifice that is a Parallelogram admits only a Body of a priſmatick Figure, it is required, not only that the Breadth of the Priſm be no bigger than the given Orifice, but that it be equal and like to it; for if the Body received be leſs than the Orifice, then not only this Body, but an infinite Number of others, of various Figures, may enter the Orifice with it. And ſo much for the Neceſſity and Uſe of Pores of various Figures.

The Canals and Liquors of all Men have the ſame common Properties; but if, for Example, the Blood of all Men were compounded of equal Parts, equally ſmooth, round, or the like, then all Men would be of the ſame Temperament, and all equally alike healthful. We may ſuppoſe them ſimilar, as to the Veſſels; but not as to the Liquors contained in them. Hence it is, one is more adapted to this Kind of Action, this to another; one more diſpoſed to this Kind of Diſeaſe, another to another Sort; and theſe Properties are called Temperaments: Thus it follows, that all Men are govern'd by ſome of theſe, from whence they may date their Cauſe of Sickneſs, or their Defection of Health, which may not improperly be called the Riſe or Origine of a Diſeaſe. Thus the ancient Phyſicians aſſigned Four Temperaments, but they were ignorant of the various Motions of the Fluids, and the ſeveral Secretions made from thence, by which we can better account for the Diſorders in the Animal Oeconomy, when we conſider the Motions of the Fluid, whether circular or inteſtine.

The radical Heat and Motion of the Parts I take to be maintained and continued by the Attrition of the Particles of the Blood, which is produc'd from the firſt Spring of Vital Air, inſpired *ab Origine*, and propagated by the Aſſiſtance of the Lungs, which never ceaſe to ſupply the Fluid with that *Pabulum* which is immediately convey'd into the Arteries, where it continually divides

the Particles of Blood, expands it ſelf, and ſo raiſes that Motion which propels the Blood with ſuch an *Impetus* as has been vainly aſſigned to an impulſive Faculty in the Heart; for by the great Reſiſtance of the *Pondus* of the unactive Fluid, the elaſtick Spring of the Air forces it in a progreſſive Motion, being continually driven forwards into the Arteries by the Inſpiration of the Lungs, and Compreſſion of the Diaphragm.

To explain this, we muſt conſider, that the ſolid Parts are fabricated from that by which they are afterwards nouriſh'd, and receive their Augmentation; for ſince Nutrition and Increaſe is the Appoſition of the Parts, it ought to conſiſt of ſuch like Matter as is ſufficient for the growing Parts and their Increaſe, and which may afford a Riſe for Parts to ſpring from them; and ſo the Blood that is the Liquor contained in the Veins and Arteries ſuffices for an Increaſe to the Parts, and therefore gives Riſe to thoſe, and from that the common Properties to the Blood and ſolid Parts, amongſt which Heat is to be reckon'd: Therefore the ſolid Parts receive Heat from the Fluids; I ſay Heat from the Fluids, which conſtantly ſupply them with Heat and Motion.

For the homogeneous Blood that excites Heat by Expanſion, and the endeavouring to ſet it ſelf at Liberty, is agitated by nothing elſe than the Attrition of the Parts produc'd by the *Impetus* of the Air's Elaſticity, which is proportionable to the Velocity of its Emiſſion into the Blood, and the Reaction or Reſiſtance of the Arteries and the antecedent Blood which follows: If that Reſiſtance be not altered by the Change of its Force, and the Velocity impreſs'd from the Heart, the Effects will be proportionable to the Heat, and that Heat to the Motion of the Blood.

From hence after the ſame Manner is explain'd, that if that Swiftneſs of Motion impreſs'd from the Heart (by means of Air ſent thither from the Lungs) be equal, no Change can happen from the Heat of the Blood, but from the different Reſiſtance and Reaction of the Arteries and the preceding Blood. But the Reſiſtance and Weight of the preceding Blood is proportionable to its own Weight, and that is proportioned according to its Nearneſs to the Heart; for by how much it is nearer to the Heart, by ſo much the Weight of the Blood is greater that is contained betwixt the Place receiving and the Extremity of the Artery; and the Reſiſtance of the Artery is alſo much the greater, by how much nearer its Approach is to the Heart, ſince the Reſiſtance in this Caſe is agreeable to the Quickneſs and Swiftneſs of the Motion, and that Quickneſs ſo much the greater, by as much as it is nearer to the Heart.

But it will be worth while to examine the Opinion of ſome of the Moderns, who will needs have innate Heat to be an Effect of the Fermentation of the Blood, brought in by the ſubtil Matter, and preſerved by its perpetual Action: So many eminent Men aſſign the Cauſe of Heat in the Blood to the Action of the ſubtil Matter, ſince they find not in the Blood any right-lin'd Pores anſwering to that Motion propagated by even Lines variouſly exagitated, and endeavouring to unite the Parts of the Blood, and the inteſtine Motion quicken'd up in that which differs little from Heat.

'Tis evident, thoſe Philoſophers ſuppoſe the ſubtil Matter to be reflected from the Parts of the Blood; for the ſtrait-lin'd or rectilinear Pores, if not to be found in the Blood, ought at leaſt to be diſtinguiſh'd in the Meeting of the Parts of the Blood betwixt one Extremity of a Pore and the other, (which may truly be called a Canal) which Parts comprehend Pores that are not ſufficiently large. But if this be ſuppoſed the Cauſe of Heat and Fermentation in the Blood, when extravaſated into the *Pelvis*, and there confined; for Example, that there the Spirits grow hot and ferment, it is quite otherwiſe; for Blood extravaſated, is ſo far from being exagitated by the ſubtil Matter, or inteſtine Motion, that it entirely loſes that ſuppoſed Heat and Fermentation.

For as Air confined in the Intervals of two Marbles adhering together, and cloſed on every Side, is hindered in its Action, leſt the adhering Parts by Turns ſhould ſeparate; therefore, tho' we grant the ſubtil Matter Exiſtence, yet thoſe Parts united together will detain the Spirits in Contiguity; and if it be admitted, a Continuance among the Pores from one Side of the Portion

that Portion of Matter, to the contrary Side of that Portion, or at leaſt to that Portion next contiguous to it. For that Reaſon, that Part will be held in *Equilibrium*, nor can it be moved in its Place: From whence there is no original Cauſe for inteſtine Motion, or Heat, or Fermentation, to be expected from the ſubtil Matter.

If there was any Gravity in this ſubtil Matter, that it could cauſe a Change or Alteration in the Air; but ſince this ſubtil Matter admits of no Gravity, there is nothing to be hop'd from it, becauſe it is not heavier in one Place or Time than in another, it compreſſing all Bodies with an equal Force, in all Times and in all Places, and therefore cannot be the Author or Cauſe of any Change or Fermentation.

But if there be no ſuch ſubtil Matter, as *Carteſius* fancied, as it is certain there is not, then there is no inteſtine Motion, or any Fermentation in the Blood; which is manifeſt from the Nature of Fermentation, which is properly the reciprocal Action of an Alkali with an Acid. In every fermentative Liquor there is a burning Spirit, but Blood affords not any burning Spirit, but what is only urinous; from whence we may judge the Fermentation to be wanting in that Fluid. For in the Trials of vegetable Juices we find, that before, or with, Fermentation, they afford nothing but Oil and Phlegm; but if the ſame Juices be fermented, they will allow us a burning Spirit, and but little, if any, Oil. Such is the Ætherial Spirit of Wine: For, by the Fermentation, the acid and alkalious Particles mutually unite the Oil and Phlegm into one Body, which becomes a Spirit; hence it is thoſe Spirits become inflamable.

If you take a burning vegetable Spirit, highly rectified, and add to it a Quantity of Water, let it ſtand a Month in an open Veſſel, and you ſhall perceive the Oil ſwimming at the Top, and ſeparated from the Phlegm, but the Spirit periſh'd, as you may diſcover by your Taſte. This Truth is eaſily confirm'd, and that there is no Fermentation in the Blood, which is a mutual Action of Acid and Alkali; but where either of theſe is wanting, as the Acid is in humane Blood, a true Fermentation cannot ariſe; and that there is none in the Blood, will be manifeſt to thoſe who will take the Pains to explore that Liquor.

I underſtand a Fluid to be that Body, whoſe Parts yield to every Force that is brought in, and by yielding are eaſily moved amongſt themſelves. This Definition agrees with that Hypotheſis of *Archimedes*, who aſſigns that to be the Nature of the humid or fluid Body, that the Parts of it lying equally to a leſſer Preſſure, is expell'd by the greater. For this Hypotheſis plainly aſſerts, that the Parts leſs preſs'd yield the greater Preſſure of the Fluid; that the leſſer Parts preſs'd are at Reſt in reſpect of the greater Force that preſſes 'em, for the leſſer Motion has ſome Reſt in reſpect of the greater; the fluid Parts reſting, yield to every Mover. From theſe Things it follows, that if any Fluid be equally preſs'd on all Sides, (ſpeaking of a particular Fluid, ſince the humane Body, and all thoſe Liquors contained in it, are on all Sides equally preſs'd by the Air and other circumambient Fluids) then all the Parts of it are equally preſs'd, and at Reſt, without any Motion amongſt themſelves.

Suppoſing any Fluid in a Spherical Veſſel uniformly and equally preſs'd in it from all Sides, if any Part of it begin to move, all the Parts in like Manner will do the ſame, and they will move in the ſame Diſtance they were placed from the Center; becauſe we may well ſuppoſe, that the Fluid, or all the Parts of it, were equally preſs'd, and the containing Veſſel immovable; and where the Equality of all the Parts are in the ſame Diſtance from the Center of the Sphere, they are moved either towards the Circumference, or kept in the ſame Diſtance from the Center: They are moved into any Part, either Eaſt or Weſt. But when we ſuppoſe the Fluid homogeneous, all the Parts of it are alike equally heavy, or equally light, therefore have the ſame equal Tendance, either to the Center, or the Circumference.

If the Fluid be not homogeneous, all the ponderous Parts deſcend to that Center towards which they gravitate, the reſt equally heavy keep the ſame Diſtance from the Center as before, and are therefore at Reſt in themſelves, as *Archimedes* demonſtrates, and ſhews in the ſame Doctrine, that all the Parts of Water, for Example, (that we may ſpeak of that Fluid, ſince the Property and Laws

of all Fluids are univerſally the ſame) conſiſting and being equally in the ſame due Poize or Ballance; ſo that there is no properer Center for one Part in the Earth than another, in the ſame Superficies of the Sphere laid by a Right-line to the Center, all are equal: And ſince it is the ſame in every Surface of the Water, it is certainly manifeſt, That no Part of the Water (as it is uniformly fluid) can come nearer, or recede farther, from the Center of the Earth; and therefore the Parts of the Water are immovable in themſelves.

From hence I infer, there is no inteſtine Motion of the Parts, and ſo no Fermentation, according to that Senſe of Dr. *Willis*, who defin'd Fermentation to be *Motus Inteſtinus Particularium Corpus Componentium*; and there are others that after the ſame Manner confound Fermentation with inteſtine Motion.

Since I have already taken the Liberty to wander beyond the Deſign of this Tract, I ſhall indulge my ſelf a little farther to explain the Animal Oeconomy. And Firſt,

The Meat chew'd by the Teeth, and mix'd with the *Saliva*, that it may the more eaſily be ground and yield to a farther Impreſſion, is made moiſt by thruſting into the Stomach, in which Place, by the Help of the perpetual Motion perform'd by the Tunicle of the Stomach, and the Muſcles which aſſiſt in Reſpiration, in which the *Diaphragm* preſſes the Stomach to and again by Turns, the Parts of the Food, with the *Saliva*, and the ſerous Liquors of the Glands, are made ſoft, broken in Pieces, waſted, and divided into leſſer Parts, till they become ſo ſmall as is requiſite for Fluidity: From theſe, together with the Liquors of the Glands, and the Drink received, are form'd what we call Chyle.

So that the Parts of the Aliment are not diſſolv'd by any inteſtine Ferment, and innate Force of the Stomach, into eſſential Parts, as they call 'em, and Elements, whether Chymical or others, by any Separation of any Things of a different Kind firſt united, and the Union of other Parts that were firſt ſeparated, as it is in every Fermentation. For Example, Wine, in which the Tartarous Parts, firſt united, are ſeparated; and the Parts ſeparated of the Phlegm and Oil are properly united, and compound a true Spirit by Concoction; as it is in the Stomach, the Eatables are broken into more intire Parts, like thoſe of the Blood, but thoſe much leſs, in like Manner as Coral ground on a Marble with Water is broken and reduced into an impalpable Powder, whoſe Parts are ſmall Corals, and not the Principles of Coral diſſolv'd from its Union.

For Proof of this, there appears to be no Need of any other Argument, than that in the Stomachs and Inteſtines of larger Fiſh, who devour and digeſt the leſs, the Chyle is nothing elſe but that Liquor ſwimming with the Fibrils of the Fleſh of the devoured Fiſh, or the ſmaller Part of Fibres, which differ not from the larger but in Size, as a Microſcope will inform us.

Chyle ſo elaborated in the Stomach, is expell'd thence into the Guts by the alternate Motions of the Stomach, from the Help of the aſſiſting Muſcles, in whoſe firſt Paſſage it is diluted with the Liquor of the Gall, and the pancreatick Serum; which Liquors produce no Effervеſcence, either from the Chyle, or mutually with each other, but placidly and quietly are intermix'd: But by the Help of thoſe Liquors a greater Fluidity is given to the Chyle, from whence it happens that the Parts of the Aliment are ſo diſſolv'd by the Motion of the Stomach; but in Defect of a ſufficient Proportion of Liquid, there is not a ſufficient Diviſion, and ſome Parts lie hard upon others, but at length they obtain a larger Space in the expanded Fluid, that they may the more eaſily move themſelves and be moved, and the leſſer be extricated from the greater; and ſince theſe greater Parts, or the leſs concocted, cannot, by reaſon of their Magnitude, be ſqueez'd in great Number into the Chyliferous Veſſels, they are thruſt through the Length of the Guts, and putrefy there.

Hence it follows, there is a quicker and better Digeſtion perform'd in the Day-time, and while we wake, than in the Night when we ſleep; becauſe when we wake we oftner reſpire, and ſo exerciſe the *Diaphragm*, the Muſcles of the *Abdomen*, and the whole Body, more, and ſo oftner compreſs the Ventricle.

Likewiſe, while we gently walk, or uſe moderate Exerciſe, we more perfectly and ſooner

ſooner digeſt our Food, than by a ſedentary nd an unactive Life, when we ſeldomer nove the Spirits and contract the Muſcles. So in Winter we have a better Digeſtion han in Summer, becauſe the Senſe of Cold compells us to exerciſe the Body with a uicker Motion.

But that Ferment of the Stomach which is ither *Saliva* or the *Serum*, iſſuing from the Glands of the Stomach, contributes no farher to the Digeſtion of the Food, than that hey mollify and render it eaſier for Diſſoluion; neither do theſe Liquors flow into the tomach to further the Concoction, but as he Motion of the Teeth, *Oeſophagum* and *tomach*, effect it, by expreſſing thoſe Liquors hat then flow to it. For it is evident thoſe Liquors alone do not perform Digeſtion, beauſe if you mix them in any Place equally s hot or hotter than the Stomach with Fleſh r Herbs, they will never turn it into Chyle, ut remain unmoved. That it is a Wonder why a Faculty of converting the ſolid Food nto a chyliferous Liquor ſhould be aſcrib'd o the Serum of the Blood, which is only ecern'd from the Glands, when the Serum vidently is not the *Menſtruum* for diſſolving Bread, Fleſh, or Herbs.

But all this Buſineſs will be better underſtood by Mr. *Boyle*'s digeſting Machine, in which there is no Need of Fermentation, but f Heat, and the Preſſure of the Air rarefy'd, nd not finding a Paſſage out, diſſolves Bones nd Fleſh, with the Addition of a little Wa-er, into a perfect Gelly, which wants little f the Nature of Chyle.

We have affirm'd Chylification to be a Communication of the Parts of Food, by he Motion of the Stomach, and the adjaent Parts; and by the ſame Reaſon we may ay Sanguification is perform'd by the Mixure of the Parts of Chyle, by the Motion f the Blood and the Arteries, and the Comreſſion of the Lungs, by which it comes to paſs, that the Parts of Chyle, and the Parts f the Blood, being equally ſmall and equaly ſmooth, they may eaſily ſlide one upon nother, and ſo flow together, ſo that the Liquid may become homogeneous in the Canals, from whence, towards this Sanguificaion, we need not aſſign any Ferment in the Heart or other Parts.

But all the Parts of the Body are nouriſh'd from Blood, or that which is ſecreted from it, which is not the red grumous Part of the Blood, but the white and ſerous, from which is fabricated the Bones and all the ſolid Parts, which receive their Nouriſhment and Increaſe from that Fluid, which, after its Separation, becomes heterogeneous to the Blood. After the Chyle is mix'd with the Blood by the known Ways agreed on, we ſhall proceed to explain the Buſineſs of Reſpiration.

It is plain by many Trials, that the Air is ponderous, and that the Air is a Fluid; therefore, from the Nature of a Fluid, Air breaks into whatever Place is more empty, or in which it finds a leſs Preſſure and Reſiſtance than that is which it ſuffered from the other Parts of Air which preſs'd upon it before; therefore at the firſt Birth the *Larynx* will be fill'd with Air, from whence the Gravity of the external Air is removed from the internal, or it would be of equal Weight betwixt the external and internal Air; and then at firſt the Muſcles dilating, the Breaſt could not come to Action, before the Air had broke into the Cavity of the Breaſt. The external Surface of the Breaſt will be preſs'd with the Weight of Air equal to the Weight of Mercury, of twenty four or twenty eight Foot high, having the ſame Height with the Breaſt, the Muſcles dilating the Breaſt could not be puffed up, and ſo contract from that Preſſure; and therefore the Breaſt could not be dilated, but removing that Quantity of Air which made up an Æquilibrium with the external, the leaſt Force would raiſe up the Muſcles, ſerving for Inſpiration: But the Air cannot gain Admittance into the Lungs but by the *Aſpera Arteria*, by whoſe Ramifications it ought to be diſpers'd into all the Lobes of the Lungs, and the Bladders that form thoſe Lobes; ſince it is preſs'd by the Weight of the Parts, and the Gravity of the Air that lies upon it, even to the utmoſt Extremity of the empty Space of thoſe Veſicles; and this Action or Series of Actions we call *Inſpiration*.

As the Air is the Cauſe of Reſpiration and Inſpiration, ſo likewiſe is it of the Dilatation and Contraction of the Arteries; for

for the Arteries being fill'd with Blood, the Truſion of the Air with ſuch a Force from the Action of the Muſcles in Reſpiration, propels the Blood forwards towards the Extremities of the Arteries; and after that violent Dilatation ſucceeds Contraction or a Syſtole; and from hence comes what we now call the Pulſe. But becauſe there are many Differences of Pulſes obſerv'd, from whence Diſeaſes and their Alterations are uſed to ſucceed, therefore I will give a ſhort Explication of ſome more particular Diſtinctions.

When an Artery is dilated beyond the uſual Bounds of its accuſtomed Dilatation, we call it a great or vehement Pulſe; but if the Dilatation of the Artery be not ſo large as uſual, it is call'd a ſmall or weak Pulſe.

But if betwixt two Dilations it intercepts a longer Time than it is wont to do, it is called a ſlow Pulſe; but if the Dilatation intercepts a ſhort Time, it is called a quick Pulſe.

Laſtly, If the Tunicle of the Artery, from ſome Cauſe or other, be harder than uſual, it is called a hard Pulſe; but if by a contrary Cauſe it be ſofter, then it is term'd a ſoft Pulſe. Therefore it may be of Uſe to know the Difference of Pulſes diſtinguiſhable by the Touch, which are three; great and ſmall, quick and ſlow, hard and ſoft: Some others there are, but more inſenſible to the Fingers. Some Dilatations may be ſo ſmall, that we cannot diſcern with all the Aſſiſtance our Fingers can give us in the touching them: Hence an unequal and intermitting Pulſe may be only a Species of a quick and a ſlow Pulſe.

Let us come to the Conſideration of the Blood, not only in the naked Arteries, but as it is diſtributed into the *Viſcera* and Glands, in which Places different Liquors are ſeparated from it: In the *Liver*, *Pancreas*, *Cuticular Glands*, and others almoſt innumerable Places, diſcovered and explained by the Induſtry of *Anatomiſts*.

That Portion of the Liquid contained in the Arteries, and which enters into the minuteſt Branches thereof, conſiſts of two Kinds: Part of it is more movable, and deſerves to be called a Spirit; but the other Part is more viſcous, and adglutinated by Heat, in reſpect of the active and volatile Parts, which procure a greater Fluidity; and from hence the Brain is ſupplied with all thoſe fine ſubtil Fluids which are diſtributed in Plenty through all the minute *Ramula* of the *Cerebrum*, and by the elaſtic Spring of which the Trunk of the Veſſel is ſhak'd with a Concuſſion more than uſual, and ſo the Liquid falls and preſſes from the Trunk in a greater Quantity into all its leſſer Ramifications.

From that Liquid that flows in the Brain we ſhall deſcend to that which flows into the Chamberpot, which we call Urine, and which is ſeparated from the more homogeneous Fluid of the Blood by the Strainer of the Kidneys, through which the ſaline Particles, precipitating with themſelves a Portion of the earthy Dregs, paſs away with the ſuperfluous Stream of Water; for the Texture of the Blood being broken by the Configuration of thoſe heterogeneous Particles, they are ſeparated and left behind in the *Pelvis* of the Kidneys, as unapt to continue the Union of the flowing Maſs, not being equally ſmooth and lubricous, or equally light or ponderous, to make and intimate Mixture, and glide along with the remaining Fluid.

Upon all the Experiments to be made on Urine, it will be found to contain nothing but common Salt and Earth. For if you take a Quantity of that Liquor, and evaporate off the Humidity in a Sand-heat, till the *Fæces* be of the Conſiſtence of Honey; then throw on the Reſidence as much freſh Elementary Water as was exhal'd; and this new Addition, by the Help of a ſmall Digeſtion, ſhall become as perfect an urinous Liquor as it was at firſt when emitted from the Bladder, and ſo it ſhall continue after ſeveral the like Repetitions.

The Uſe of the *Teſtes*, I think, is diſputed by none; namely, That they elaborate the *Semen Virile*; but that they give the perfect Form and Figure to the ſucceeding *Embryo*, from a true and mature *Semen*, is not ſo well underſtood.

In the natural Mechaniſm of every ſpecifical Generation, there is a particular Direction and Tendency in all the Parts that compoſe that Machine to propagate its like.

There-

Therefore Man, who is the perfecteſt Be-
ng of the Animal Creation, and who was
rought into the World replete with all the
laterials neceſſary to propagate a perpetual
eneration of reatures like himſelf, muſt
eeds have the whole Form and Figure of his
pecies contain'd within himſelf, and there-
re ſtill exiſtent in his Nature, and ſo of
onſequence muſt have proper Parts form'd
r the actuating and bringing to Life ſuch
tent Embrio's, as afterwards receive their
rowth and Increaſe from proper Matrixes,
om whence they are nouriſh'd by the ſame
ind of univocal Heat and Aliment as at firſt
ey were form'd. For we need not per-
lex our ſelves with the Learned *Harvey* and
thers, whether the Brain or Heart receiv'd
he firſt Formation, ſince all are equally form'd
ogether, though perhaps ſome Parts diſpro-
ortionable to the reſt may receive a great
ddition of Growth in their Infancy, the
hole Frame at firſt being in a State of
luidity, ſome of the Parts become more
onſpicuous than others; which has deceiv'd
any curious Inquirers hitherto. But the
any Obſervations that are daily made, and
hich admit of farther Tryals, will inform
s, that there are many Parts in Infants that
re very large in that State, and afterwards
windle away to almoſt nothing; and many
thers which in Infants are not viſible, but
n Adults appear of abſolute Neceſſity to the
ody.

In our Obſervations upon the *Teſtes* of
dult Perſons, we may conſider the Forma-
on and Conſtitution of the Parts, whoſe
urious Contexture ſeems to be deſign'd after
wonderful Mechaniſm for the Configura-
on of that Liquor call'd the *Semen Virile*,
hoſe Texture is entirely form'd and modell'd
om the *Teſtes*: For in a *Gonorrhœa* you may
bſerve, by the Help of a Microſcope, that
he Texture of the Parts are broken, the
Union reſolv'd, and the Nature of that Fluid
bſolutely deſtroy'd by the Intromiſſion of
hoſe heterogeneous Particles.

After all that has been ſaid by the An-
ients, and the blind Aſſent that many of
he Moderns give to their Authority, it will
e ſomething ſingular, and look'd upon as a
old Aſſertion, to affirm, that Women are
f a hotter Conſtitution than Men.

But this will not appear ſo ſtrange, when we ſhall examine and find, that Women have abundantly more Blood, proportionable to their Size, than Men have; tho' it muſt be acknowledg'd, they are more humid, and Men more dry. So Infants have much more humid *Serum* in them than young Perſons, yet they are much hotter; as any one may be ſatisfy'd in, that will pleaſe to make Tryals either of the Blood or Urine of Children, and compare it with that of Adults; and they will ſoon confeſs this Truth, that Infants are hotter than young Perſons, and they much hotter than ſuch as are grown to a full Age: And we muſt grant, that Women, as well as young Men and Children, are more lax and ſoft; and that from their greater Abundance of Lymphatick Juices, they ſooner come to their full Growth and Maturity than Men. The *Lunar* or Monthly Courſes demonſtrate to us, that they have more Heat, as well as more Blood, than Men; for whether we aſſign the Cauſe of that Evacuation to an Ebullition or Fermentation in the Blood, or from too great a Quantity of Fluid, which we call a *Plethora*, it will be equally reaſonable to conclude, that Women have more Heat in them than Men, which is not maintain'd by preternatural Diſturbances in the Maſs of Fluids, but by a conſtant regular Courſe of Nature.

If we enquire ſtrictly into the firſt Origine of Blood, we ſhall find it in its Infancy to be pellucid, not to have any Thing of Redneſs in it; that red Colour being the Effect of a Progreſs of Digeſtion, and Mixture of Parts, by the Addition of Heat, which is maintain'd and increas'd by the Reception of Air, that is diſmiſs'd, and paſſes through the Pores by Reſpiration; and we may obſerve, how Heat is continued by Incubation in Oviparous, or the Heat of the Womb in Viviparous, Animals. So the *Cicatricula* of the Egg, which by actual Heat of the Hen becomes in a ſhort Time of a red Colour; nay, the Heat of Horſe or Pidgeon's Dung will ſoon produce that Variation of Colour. But it is not the grumous and red Part of the Blood, but the pellucid and ſerous only, which becomes nutritious; for the grumous (when ſeparated) cannot be computed at above a fifth Part of the whole Maſs; ſo that if the ſolid

Parts

Parts were only to receive their Nouriſhment and Increaſe from that, all the other muſt be reckon'd excrementitious. But Obſervations, and the Tryals made on that Fluid, will inform us, that the grumous Part of the Blood, by reaſon of its fibrous and agglutinating Particles, is leſs qualified for the Nutrition of the Solids of the Body, and for the Separation that is perform'd in the Glands, but rather fitted to continue and maintain Heat and Motion in the Veſſels; whilſt the *Serum*, conſiſting of watry Parts, though it abounds equally repleniſh'd with Spirits and volatile Salts in Proportion to its Quantity, becomes a more proper nutritious Juice than the grumous Part of the Blood can be admitted, becauſe that has a third Part more of fix'd Salt and Craſſament of Earth in it than the *Serum* has: And it is from this Fluid we muſt account for the vaſt Quantity of Matter which is daily thrown off by inſenſible Perſpiration, as *Sanctorius* has judiciouſly obſerv'd in his *Medical Staticks*.

And we have not only this great Man's Word for it; but this is generally confirm'd by the Obſervation of the modern Practitioners, who begin to find the great Uſe of promoting or obſtructing Perſpiration in the Cure of many Diſeaſes, of which we have an accurate Diſſertation of the Learned Dr. *Coles*; and tho' there may be as yet many different Opinions *de Modo & peragendæ Ratione*, yet as many as will give themſelves Liberty to reflect and conſider the Reaſonableneſs of the Doctrine of Perſpiration, will no doubt ſoon be brought to acknowledge the many Uſes and Advantages that Inquiry may be of, to the Practice of Phyſick, and to the more certain Knowledge and eaſier Cure of Diſeaſes; ſince common Obſervation will convince ſo many of the Reaſonableneſs of ſuch a Perſpiration as *Sanctorius* aſſerts, when we ſhall conſider the innumerable Apertures of the Glands diſtributed through the whole Contexture of the Skin, by which that Fluid we call *Serum* is conſtantly exhaling, by Means of the Rareſaction proceeding from the natural Heat of the Body, which diſpos'd it to ſuch a Motion; for we muſt acknowledge, that ſubtle Vapour, which inſenſibly paſſes away, is produced from an univerſal Heat of the Parts, which attenuates the more viſcous Particles of the Fluid to ſuch a Fineneſs, as to be able to paſs under the Form of the moſt ſubtle *Effluvia*, which eaſily pervade the minuteſt Veſicles of the cuticular Glands, and is perform'd from that Power in Nature, which is nothing elſe but Heat it ſelf, which the Motion of the Parts, whether internal or external, excites, and diffuſes from the Center or vital Flame to the Circumference.

For this *Flamma* or actual Heat within us is maintain'd and continu'd by the conſtant Addition of nitro-aerious Particles which we daily inſpire, and which is the Author and Enginier, the peculiar Intendant of the Functions aſcrib'd to the Animal Oeconomy. This is that which buoys up and ſupports this curious Fabrick, and which ſtill ſuſtains and preſerves his Being. This is the Fountain and Original of Life; yea, even Life it ſelf. And we cannot but obſerve, that Perſpiration is the peculiar Effect and neceſſary Conſequent of Inſpiration: Nay, by this Way of Perſpiration is ſhown the moſt eminent Specimen of the Creator's Wiſdom: If we contemplate it aright, we ſhall find nothing more beautiful, nothing more admirable.

By this Method, there is no Need of Sphincter Muſcles, or any Compreſſion of the Parts, no Vibration or Conſtriction, no Need of an impulſive or expulſive Faculty, or any Occaſion for tranſverſe Fibres; the fix'd and leſs watry Humours being attenuated or divided into finer Parts by the Rarefaction that the ſubtle Particles of the Air procure in the groſſer Fluid, by the Intromiſſion of thoſe new Bodies which raiſe and ſupport the *Flamma*, which ſoon exhales the watry Element upon the Wings of Heat's peculiar Levity, whereby it finds the readieſt Paſſage for its *Exit*.

There are ſuch almoſt infinite Canals, Veſicles, and Pores, in the Frame and Compoſition of Animals, that they cannot be conceiv'd, much leſs are they to be diſcover'd to the naked Eye. Who can number the Hairs of his Head, every one of which has a diſtinct Nerve or Fibre? And many more there are lodg'd in their Interſtices; nor is there any Doubt but the ſame Reaſon will hold throughout the Body. So Nature appears,

pears at first Sight like a Prodigy; where-ever you look, you may see Canals, Strings, or Fibres; not the minutest Part of the Body, whether external or internal, is without them: Nay, the whole Structure is nothing else but a *Congeries* of Pipes tied together by proper Bands of Union.

Since I have enter'd into this Subject, of enquiring into that Fluid call'd Blood, and from thence occasionally to touch upon Perspiration, I shall beg Leave to continue on the Digression (I hope not unusefully). Since I have affirm'd the *Serum* to be the common nutritious Juice of the Body, I must proceed with the Separation of the *Serum* from the Blood, which is perform'd by Percolation through the Glands, which changeth its Redness, though not its Nature: For Dr. *Needham* affirms the Spermatick Parts are nourish'd by the *Serum*; and it is not improbable to suppose, that the Formation of the *Fœtus* is compleat before any Redness appear; and there are many Animals that have no Redness at all in the Blood, therefore call'd *Exanguious*, they being of a colder Temperament.

There are certainly two distinct Excretions in the Liver; the one is by the *Poribilarii*, the other by the Lymphæducts, which are here very numerous, and of whose Use I shall have Occasion (in a little Time) to give the World a larger Account. In the mean time, I shall observe to you, that these Lymphæducts in the Liver inosculate the Extremities of their Trunks with the *Poribilarii*, which cannot be said of any two distinct Sorts of Vessels that carry distinct Liquors in them throughout the whole Body again. From hence I might attempt some Account of the Secretion of that Liquor we call Urine, and of its nearer and more ready Passage to the Bladder. But let this Hint suffice, till I have Time and Opportunity to bring that Discovery to Light.

The Parts of the *Serum* are Products of the Nourishment eaten, and the Materials out of which all the Parts of the Body, as well Nutritive as excrementitious, are made: As first, The *Saliva* is but Part of the *Serum* separated by the Salivatory Glands, as the Liquor of the Ventricle is deriv'd from the Glandulous Coats thereof. This being but a crude Mixture of alimentary and excrementitious Parts, wants a farther Separation, which is done by more *Serum* still thrown on the alimentary Mass in the Guts, both by the great Channel of the Pancreatick Duct, and the lesser Oozings of all the spongy Glandules of the Guts and Mesentery, which promotes the former Separation by the Addition of the Bile, which being mix'd with this Mass, attenuates all the Juices in the *Duodenum*: And after all this, the *Serum* is again cohobated (if I may so term it) upon the alimentary Mixture *in Receptaculo Chyli*, and so passeth with it, being squeez'd up the *Thorax*, till it become united to the Blood; though there is not any momentary Mutation made of it, either in the Heart, Lungs, or elsewhere, but by the Agitation of its Parts admitting the Spirits to pass and repass through it, till 'tis gradually work'd up into the Nature of Blood and *Serum*, which Fluid makes Perspiration of such absolute Necessity for maintaining the Animal Life in such a State as we observe it; nay, and that of Plants too, in which it appears to be as useful as it is in the Nutrition of Animals.

For it is wonderful to observe what assiduous Perspiration there is always in Vegetables; nay, what a profuse Distillation thro' all their Pores; indeed so great sometimes, that many Trees have run like Fountains, as the Pine, and the Fir, which contain in them much viscous Juice, and withal cast off great Quantities of Water; because that viscous Juice which is the proper Aliment of those Trees cannot permeate the closer Pores, unless diluted with a sufficient Quantity of Water, so that it may be reduced into finer Particles, which requires immense Quantities of Water to perform, and consequently a powerful Evacuation: But it is certain, that not an hundredth Part of the Water which is applied to the Roots or Seeds of Plants, and which they imbibe by the Protrusion and expansive Force of the Air, is converted into the Growth and Nutrition of the Plant; but it transpires, and is exhal'd in its Motion thro' the succiferous Vessels into which it is convey'd. And here by the by it will not be out of the Way to observe, how far the expansive Particles of the Air may contribute to the Nutrition and Augmentation of Plants, and the introducing their nutritious Juices: For those long and obtuse Par-

ticles of Matter, which penetrate and constitute all denſe and compact Bodies, gain Admittance into Plants, by dilating their Veſſels as the nutritious Juices pervade their Pores; though that nutritious Juice is not meer elementary Water, but a certain viſcous Matter, which lies undiſcover'd, and is convey'd in that Vehicle; for the viſcous Juice it ſelf is not ſo adapted to penetrate the cloſer Pores, till it be firſt attenuated and divided into ſubtiler and finer Parts, and ſo made more fluid, that, together with the Water, it may more readily and with the greater Facility be convey'd through the minuteſt *Tubula* of Vegetables.

It will then follow, if we rightly conſider the Motions of the Fluid in Vegetables analogous to that of Animals, that Air is a very conſiderable Ingredient, and the efficient Cauſe of the Motion of the ſeveral Fluids of the Animal Body; for when a Rarefaction is made by the Attrition of the Solids, the ſubtiler Particles of that Body being long and obtuſe, eaſily inſinuate themſelves into the cloſer and compacter Parts of the Body; after which will follow the globulous Particles of the Fluid, from the Diſtention that was made for them by the foregoing Particles of Air, which expand themſelves as they are put into quicker Motion.

Since therefore we have occaſionally run our ſelves into the Argument of inſenſible Perſpiration, it will be neceſſary to conſider how far thoſe ſix Things we call *Non-naturals* do affect us. And Phyſicians, that wiſely follow the Directions of Nature, ought to ſhow themſelves wonderfully ſollicitous about the Uſes of Perſpiration, when they conſult the Cure of Diſeaſes.

The firſt of thoſe Things call'd *Non-natural* is Air, of whoſe Uſe and Efficacy, either in the Preſervation of Health, or Cure of Diſeaſes, I ſuppoſe few are ignorant; but that it chiefly affects us, when it either aſſiſts or hinders Perſpiration by its Admiſſion or Retromiſſion; for tho' it enter by Reſpiration, this only appears to be a Species of Perſpiration, ordain'd by Nature for throwing off the fuliginous Vapours of the Heart and vital Parts. Nay, it is by the Inſpiration of this Air that the Motion is continued or detain'd; becauſe, affecting the Parts through which it paſſeth, it either opens or conſtipes the Pores, according to the Quality it was in when received: Therefore temperate Air is thought the moſt ſalubrious; for the hotter it is, it hinders the Perſpiration by diſſipating our Heat; but if colder, it obſtructs the *Exit* or Paſſage of the Vapour by Conſtipation. The humid and watry Air gluts up and fills the Spiracles of the Skin, from whence *Hippocrates* ſays, *Ex Anni Tempeſtatibus in verſum Siccitates aſſiduis Imbribus eſſe ſolubriores.* From hence the Uſe and Neceſſity of Garments was order'd by all civiliz'd Nations, to the End that preſerving the Body from the too immediate Influence of the Extremities of the Air, a liberal Perſpiration might be maintain'd. But ſince it was neceſſary that the Head and Face ſhould be more expos'd to the external Air, Nature has ſenc'd the Brain on all Sides with hard Bones, and a conſtant Cloathing, that by its Sutures and numberleſs *Foramina*, which ſcarce any Injury of the Air can interrupt, there might be free Admittance for the cloudy Vapours of the Brain to paſs away by: And when we lie down, we put off our Clothes, becauſe the Body perſpires better when cover'd in Bed, as thoſe experiment who lie down bound in their Clothes; for the next Day they are us'd to complain of a Weight and Wearineſs of their Limbs: And to the ſame End we uſe external Fires, that they may contribute to the Continuation and Promoting of Perſpiration, and the opening the Pores of the Body.

The ſecond *Non-natural* is Meat and Drink, the whole Neceſſity of which depends on Perſpiration; for if nothing was convey'd and diſpers'd by the Pores, there would be no Need of Aliment, which certainly was inſtituted for that End and Purpoſe, that it might perpetually ſupply Matter for Perſpiration; and therefore the Quantity of Aliment is to be meaſur'd by the Quantity of Perſpiration, and that ought to be judg'd the exacteſt Meaſure of what we ought to eat, by what was waſted; from whence we ſhould examine how great the Evaporation was, and in like Manner eat proportionably; ſo that the exhaling Parts, by the like Continuation, may draw Food from the Stomach, and be reciprocally ſupply'd to continue the Flame with alimentary Fuel. Again, the chiefeſt Reaſon of the Goodneſs of Food ought to be

e conſider'd as it is aſſiſting and conducing Perſpiration; for that we have eſtabliſh'd be wholeſome which is eaſy of Digeſtion, d becomes ſoon diſſolv'd. On the contrary, e affirm whatever contends with our na-ral Conſtitution, and is difficult of Di-ſtion, to be hurtful and noxious: Elſe, hat do Phyſicians mean, when they com-end ſome Meats for being light and eaſy of igeſtion, and condemn others that yield avy and groſs Nutriment? But becauſe oſe that are light are readily digeſted, and duced into ſubtiler Parts by Heat; but the hers, ſince they are groſs and heavy, con-nd with the natural Digeſtion, and cannot remov'd without Exerciſe and great La-ur; and therefore ſuch-like Food becomes oper Aliment for Ploughmen and Mecha-cks, the Heat of whoſe Stomachs is much eater by their daily Labour; for otherwiſe ch Food affords a Juice too inſpiſſate to be duced into finer Parts, fit for Nutrition, d therefore leaves behind it much more crement. For Example: Bread, and ſuch-e as are eſteem'd fermentative, are reckon'd e beſt Food; becauſe (by the Help of eir Ferments) the other Eatables are re-ced into ſubtiler and more ſpirituous rts, and ſo being render'd fine and light, ey are eaſily rais'd into Vapour, and per-re: And therefore we join Bread to be with other Victuals as a laudable Cuſtom, d of the more Uſe, the newer it be after is cold from the Bake-houſe; for it loſes Ferment by its Age; and therefore while w, is the properer to be eaten with the eſh of Animals, as it is likewiſe with all ants, which ſtop the Ferment of the Sto-ach, if not aſſiſted by the Uſe of Bread. nd this is well obſerv'd by other Nations no feed much upon Plants, that you ſhall rely ſee a Foreigner eat any Kind of Fruit ithout Bread; ſo that the good Uſe of that nich is amongſt us is wholly owing to eir Example, as likewiſe the Improvement our Bread; the eating of which new, to-ther with the drinking Ale and Beer in the ne State, e'er the Ferment be loſt, I take be the chief Reaſon of the Healthfulneſs the People of *London*, in reſpect to other eat and populous Cities in the World. nd if any will give himſelf Leiſure to ob-rve, he will find this Place ſeldomer inci-dent to any Kind of Epidemical Sickneſs, than any Village in the Country, in Compariſon to the Number of its Inhabitants; for it is old Beer that ſtimulates the Fibres of the Guts and Stomach, hinders and allays the genuine Ferment of the Stomach, precipi-tates the Digeſtion, and frets off too much of the *Mucus* that adheres to the inward Coats of the Guts; and from thence cauſes Fluxes, Gripes, and Convulſions, often fatal to Children whoſe Nurſes delight in ſuch Liquors.

The third *Non-natural* is Sleep and Waking; for we relieve the Body by Sleep, not only becauſe the Animal Faculty is at Reſt, but becauſe the Heat, drawing back and retiring to the internal Parts, better digeſts, atte-nuates, reſolves and diſperſes the ſubtle Fluid through the Skin, *unde Viſcerum Depuratio & Alacritas emergit.* In the Time of Waking, the Spirits tranſmitted to the Circumference of the Body powerfully diſſipate the excre-mentitious Humours from the external Parts, from whence comes that neceſſary Viciſſitude of Sleeping and Waking; to wit, that by one the internal, by the other the external, Parts might be exonerated from their de-praved Juices; which Thing, if it ſhould blindly happen, would bring no ſmall In-conveniency to the Body.

The fourth *Non-natural* is Motion and Reſt, the Advantage of which are chiefly as they contribute towards the furthering of Per-ſpiration; for the Body dull'd with too much Reſt, ſoon complains of a Weight and Lazineſs of its Members, by reaſon of the lit-tle Agitation of the Spirits; and conſequent-ly there happens a leſs Diſſipation of the Hu-mours, which then, for Want of being diſ-charged, preſs upon the tendinous Fibres of the Muſcles, which produces that Pain and Weight which we complain of by ſitting or reſting ſo long without Motion: But Exer-ciſe ſtirs up the Heat of the Parts, and by Force (as it were) procures a Reſolution and Diſcuſſion of thoſe excrementitious Humours which before loaded and griev'd the Parts; yet if Motion be too vehement and immode-rate, it makes too great a Reſolution of thoſe good Juices deſign'd for the Nutrition of the Parts, which muſt languiſh upon a violent Expence, and wait till Reſt repair them to their priſtine State of Vigour.

The Things excluded and retain'd, conſtitute or make the Fifth Claſs of *Non-naturals*, not without leſs Regard to the Advantage of Perſpiration: For the ſeveral Ferments have Reſpect to that Evaporation as their ultimate Deſign; and the Chyle is ſo elaborated and wrought up by thoſe Alterations it has received, that it may become intimately united and homogeneous with the Blood; the only Scope and Intention of thoſe Ferments being to render it a proper Vehicle for Nutrition of every diſtinct Part: So that the Separations of excrementitious and immiſcible Parts, are made in all the ſeveral Fermentations and Digeſtions where the Perſpiration is facilitated by ſubliming the grumous and balſamick Parts of the Blood into volatile Spirits, which are diſcharged by Evaporation. For if the impure Blood be brought to the Parts, it muſt follow that the Perſpiration is contaminated in a great Meaſure; and therefore whatever is excluded by other Paſſages at ſuch Time ſerving the Intention of purifying the Blood or Chyle alſo, conduce effectually to the Relief and Aſſiſtance of Perſpiration. Therefore the Excluſion of the Excrements by Purging are thought ſo uſeful, becauſe they give a greater Liberty and Freedom for a farther Diſcharge and Separation of the Fluid by the Secretory Ducts of the Glands, by rendering the Veſſels leſs turgid and diſtended, and ſo of Conſequence allowing the Humours a free Egreſs to exhale. But this Method of Perſpiration is reduc'd to the Government of the Things excluded and retained, not that it can be contained in ſuch ſtrait Paſſages, for indeed, it is denied through all its Species; but becauſe this it has in common with other Evacuations which depend upon the expelling of the Excrements.

Laſtly, the Paſſions of the Mind bring up the Rear of this Troop of *Non-naturals*, and they are of no ſmall Force in the Command and Government of the Body, whilſt they are capable of promoting or retarding Perſpiration, by the various Commotions they occaſion in the Spirits: So Joy recreates and refreſhes us, becauſe the Spirits moving more briskly, excites a greater Heat through all the Members, by expanding of its Particles, which diffuſe themſelves immediately thro' the whole Frame of the Body: But Sadneſs juſt produces the contrary.

In a Word, if we conſider the Rules generally preſcrib'd, as well to the Healthful as the Sick, about the Uſe of theſe Six Things deſcrib'd, we ſhall find the chief Intention of 'em directed towards the promoting Perſpiration. And *Sanctorius* ſeems to aim at little elſe in that Writing of his, confirm'd by undoubted Trials: But if the Reader be further curious on this Subject, I deſire he would conſult that late accurate Diſſertation of Dr. *Coles*, *De Perſpirationis inſenſibilis Materia & peragendæ Ratione.*

That ingenious Author has aſſign'd the Matter of Perſpiration to ariſe immediately from theſe three following Heads, a nutritious Juice, Blood, and the ſolid Parts; but excludes the Chyle from being underſtood thereby; as likewiſe the *Lympha*, for almoſt the very ſame Reaſon, he does arreſt from that Imputation, altho' it be ſecern'd in the Habit of the Parts; becauſe by proper Veſſels it is carried directly (as he ſaid of Chyle) either into the Blood, or depoſited into certain Cavities within; from whence it can by no Means be admitted for the immediate Matter of Perſpiration, unleſs by Change ſomething through the Relaxation of the Veſſels out of the uſual Courſe ſhould iſſue forth: Therefore, that he may inquire into this triple Source, altho' the Weight of the whole he ſeems to lay upon the nutritious Juice, yet ſometimes the Blood and the ſolid Parts muſt bear their Share.

In the firſt Place, he affirms of that which pertains to the Blood, (that he may from thence proceed) that there are certain Stoppages or Want of Paſſage from the reſpective Receptacles, (beſide the Matter ſecreted in the Glands by a peculiar Art of Nature, which he aſſigns to be Sweat) by which they gain Admittance through the Skin; and as he allows, conſtitutes, and makes up a Part of the perſpirable Matter; becauſe when the Arteries and Veins which are diſtributed throughout the whole Surface of the Body, and not only in the internal Parts, but every where in the minuteſt Extremities of the Arteries, when they lay open their Paſſages; it cannot be denied but ſomething in the Form of Vapour, from the Motion and Agitation of

f the Blood, as well from its Heat and Fer-
nentation, by that Means diſtending thoſe
Apertures, may pervade the cutaneous Spira-
les; and more from hence, that many of
s Particles are much leſs than the Pores of
hoſe Veſſels, (which muſt be granted).
Hence, What ſhould hinder the leſs from
reaking out? But by this a very ſmall
Quantity is paſs'd in a conſiderable Time;
ut more abundantly in the greater Perſpira-
ions celebrated by *Sanctorius:* For at thoſe
Times there is a greater Relaxation, and (as
he Doctor ſays) flowing out from the Super-
icies of the nutritious Juice from all the
utaneous Veſſels, and the hidden Fibres of
he yet undiſcover'd Secretions. Yet it is
eceſſary a greater Share of theſe minute Veſ-
ls be allow'd to maintain and continue
he Circulation, that the Blood may find an
pen and free Paſſage, and be propelled into
n by a quicker Motion. In the mean Time
he groſſer, (which make up a greater Por-
on, and not leſs of Recrement, than that
hich truly conſtitutes the Blood) as it is
bvious they are wont to be ſecern'd from
hoſe Secretories plac d in the Middle of the
eſſels; becauſe, as all acknowledge, theſe
Organs that are ſupplied with the excretory
ucts, are more properly adapted for the Du-
y of Secretion, as in Example of the reſt,
hich are more deeply treaſured in the Bo-
y, which convey ſuch peculiar Liquors as
re deſtin'd for their Cavities to receive, as
ile, *Saliva*, *Urine*, *&c.*

2*dly*, The ſolid Parts, (which truly form
he Body, to which the Appellation of the
arts from the fluid Subſtances leſs properly
ppertain) as they owe their Originals; ſo
n the ſame Place where they loſe their
harge, at length they are releas'd from their
ands of Union: Theſe, if they be altoge-
her puffed up from their Veſicles, as it ap-
ears highly probable from the continual
lux of Juice running in theſe Channels, muſt
eceſſarily paſs away inceſſantly from the
Damage that otherwiſe would enſue from
he Conſtitution of their Particles.

Indeed, theſe are continually nouriſh'd
rom the included Liquor creeping within;
o in like Manner, they ought to caſt out
hoſe ſettled Particles which grow ſtubborn
y long Continuance: And by what eaſier
Way, than by Perſpiration, (and that by pro-
per Channels) can thoſe Particles be ſcat-
ter'd and diſpers'd which are brought to the
Skin, ſince this is the laſt Stage of the Body?
If it be objected (ſays he), That there are
many more of thoſe Fibres which run in a
direct Paſſage, and tend not to the Skin, but
terminate in the inward Parts: He ſuppoſes
theſe, either into the Veins, or other Cavities
appointed for that Uſe, depoſite their Super-
ficies; but when thoſe Subſtances ſo take
upon them another Denomination, becauſe
now paſſing into a Store of Liquors with
which they are intermix'd, by which Means
it happens as if they were caſt off by Tran-
ſpiration; when from hence they ſerve for
further Uſes in the Body, or come to be ex-
terminated by ſome other Artifice. This is
what he contends for, That thoſe little Fi-
bres of the Solids which pertain to the Skin
conſtitute and make up Part of the perſpira-
ble Matter, although, perhaps, as yet ſcarce
ſufficient, ſince the Reſolution is very gentle
and ſlow.

Granting this, as to ſome Part of this Mat-
ter it appears to him very probable, he con-
tinues, that,

In the third Place, the nutritious Juice
running through the Fibres, ſupplies by far
the greateſt Part of this Matter for Perſpira-
tion. And the Doctor would have this nu-
tritious Juice to ariſe from the Nerves. But
let it be from what Cauſe ſoever, or by what
Artifice it is perform'd, he poſitively aſſigns
it as the chiefeſt Material of Perſpiration, and
endeavours to confirm it by ſeveral Argu-
ments, which I can by no Means take Liber-
ty to trace at this Time; and therefore ſhall
only beg Leave to offer two or three ſhort
Experiments, which I will leave the World
to judge of what Weight they be thought
in Relation to this Hypotheſis of the
Doctor's.

Whatever has been affirm'd and ſaid con-
cerning the *Succus Nutritius* of the Nerves,
and the plauſible Arguments that have been
brought for the Animal Spirits and their
Flux, by the nervous Fibres, I think will
appear of little Validity to ſuch as will con-
ſider the following Trials made to prove their
Exiſtence if they had had any.

I muſt confeſs, after all the diligent Search
and Inquiry I was capable of making, aſſiſt-
ed by the Helps and ſeveral Inventions of
others,

others, I was never yet able to find any Foot-steps whereon to build a Foundation for the Belief of Animal Spirits; and after I had exploded the Neceſſity or Uſe of 'em in accounting for the Circulation of the Blood, without which I doubt ſome would be at a Loſs to reſolve ſeveral difficult *Phænomena* which that Syſtem affords; but if the Motion of the Blood cannot be accounted for or underſtood without the Help and Aſſiſtance of Animal Spirits, I doubt there will be a Stagnation in Spite of all the Endeavours of Circulation, according to the Laws of Nature, and thoſe Mathematical Cauſes by which we meaſure her in her regular or irregular Motions.

Of the ſeveral Effects of POISONS *on Humane Bodies; with a Mechanical Account of* Poiſons, *from Doctor* Mead, *Phyſician to St.* Thomas's *Hoſpital, Doctor* Browne, Baglivy, &c.

WHat obtains the firſt Place among the material Cauſes of Diſeaſes, are thoſe Things which are the moſt active and powerful in a ſmall Doſe, and which moſt quickly deſtroy the Oeconomy of the Vital Motions, and can break and diſturb the Actions of the Solids and Fluids; and theſe Things are commonly called Poiſons: But they are either adventitious and extrinſecal, or elſe ſuch as are begot in the Body; and theſe are Threefold: Firſt, Such as bring along with them a putrid Fermentation of the Fluid, and a contagious Infection. Secondly, A Cauſtick, which penetrates into the Solids. Thirdly, An Exotick, or Foreign Sulphureous Vapour, which ſtops the Circulation of the Humours, and extinguiſhes the volatile Spirituous Fluid of the Nerves. Firſt, The penetrating fermentative Putrefaction occaſions *Miaſms*, ſuch as we are viſited with in the Plague, malignant Fevers, and in all putrid acute Caſes, as the Small-pox, Meazles, the Contagion of each which propagates a moſt agile preternatural Motion in other Bodies diſpoſed to receive it. Beſides this, there is a contagious fermentative Putrefaction of the Nature of a fix'd ſaline Cauſtick, ſuch as we obſerve in Chronick Caſes, as the Venereal Diſeaſe, Leproſy, Scabs, and ſcorbutick Ulcers; and the *Sphacelus* and *Cancer* are Examples of the Corruption of the more fixt Parts of the Blood, which by touching contaminate the neighbouring Parts in the Body.

Poiſons are of a cauſtick Quality, and theſe again of a twofold Nature, either very volatile and active, ſuch as are in living Creatures, or more fix'd, which are found in Mineral Bodies. To the firſt Claſs, the Wounds and Bitings of Beaſts and Inſects, which are of a hot, revengeful, furious Diſpoſition, are reducible; as Wolves, Mad Dogs, Vipers, Tarantula's, Scorpions and Crocodiles; the Subſtance of whoſe Venom or Poiſon is a Cauſtick of a fiery agile Nature, which penetrating intimately into the Nerves and membranous Fibres, acts vigorouſly upon them, and ſo raiſes Spaſms, Convulſions, Fevers, and Inflammations.

Of the Mineral Kind, thoſe which are of a fix'd cauſtick Nature are, Arſenick, Mercury Sublimate, *&c.* which contract the Bottom of the Stomach and the *Duodenum* with horrible *Spaſms*; afterwards they inflame the Parts, and draw the whole *Genus Nervoſum* into Conſent, as appears by the Spaſms and Convulſions that follow. In the Vegetable Kingdom there are found a Sort of acrid Purgers which may be reckon'd among the Poiſons, as White Hellebore, *Elaterium*, *Euphorbium*, *&c.*

The

The third Rank of Poiſons are ſubtil ſulhureous Vapours, which rarify the Blood, o that it diſtends the Veſſels, particularly e minute ones of the Brain, with too great iolence, ſo that the Syſtole is made diffilt, and the Motion of the Fibres by that leans leſſen'd, becauſe the ſpirituous Fluid them ſtagnates, from whence the progreſve Motion of all the Fluids is ſtop'd. ence ariſes Palſies, Lethargies, Dreams full Fear, Melancholy, *&c.* of which Kind e moſt celebrated are Nightſhade, Henne, and the ſeveral Species of Poppies.

Thus far we have ſpoken of external Poins: We ſhall now come to thoſe Things hich are generated within the Body, and nongſt them the moſt obſervable are the tive, excrementitious, ſaline, ſulphureous umours, which are thrown off by the Pores the Skin, which if they are repell'd and rced back again into the Habit of the Bo, prove powerful, dangerous Cauſticks; is very evident to the Senſes in the Smallx, Meazles, Purples, St. *Anthony*'s Fire, out, *&c.* And what grievous Symptoms atd ſuch Revulſions, every Day's Experience tneſſeth; for when the excrementitious atter is freed from the Viſcidity of the ood which invelop'd it, it eaſily paſſes off Tranſpiration; but being tied in by the nſtriction of the Pores, and returning ain upon the ſenſible nervous Membranes, d there pent up, it acts like a Poiſon, and oduces the moſt grievous Diſaffections. for Example, if the Venom be brought the *Meninges*, a Phrenſy or Epilepſy; if invade the Nerves of the Diaphragm and ngs, a convulſive Aſthma, a Palpitation d Trembling of the Heart, or a *Syncope*: the Stomach or Gullet, it produces mps, windy Inflammations, and troublem Pains: In the Guts, Gripes, and ſuch ſtiveneſs or Binding as is difficult to be ieved. The like Things may be obſerved m ſuppreſſing fœtid or ſtinking Sweat, m the Armpits, Soles of the Feet, and lden ſtopping of profuſe Critical Sweats Fevers. The healing of inveterate Ulſ ſuddenly brings on a *Phthiſis*, with ſpaſdick acute Pains; ſo the repelling of ſtules or Blotches in the Face or Head frently affects the Eyes, Ears and Jaws. An wary Check in a due and regular Tranſpiration, is the chief Occaſion of moſt epidemical Diſeaſes; for of this Nature are almoſt all Kinds of Fevers, Small-pox, *Diarrhœa's*, Dyſenteries, *&c.* which, if they are leiſurely produced, they are not undeſervedly aſcrib'd to proceed from the Air, and the various Seaſons that hinder Tranſpiration; for by this Means the ſalt, acrid, ſubtle Serum, is mix'd with the Juices of the Body, and vitiates and diſturbs them: But the chief of all theſe Things from an interupted Tranſpiration is, that the Bile, *Lympha*, and Mucous of the Guts, mixing with the Matter of the Sweat, increaſes the Malady; from whence is preternaturally form'd an acrid Cauſtick. Therefore the Ancients did not without good Reaſon aſſign the Cauſe of moſt, and thoſe the greateſt, Diſeaſes, to the Bile, and plant 'em in the firſt Paſſages of the Stomach and Guts. All Fevers, and thoſe Diſeaſes which are derived from a corroſive Acrid, have their Reſidence in the firſt Region of the *Abdomen*; as all Intermitting, Burning, Bilious Fevers, Dyſenteries, *&c.* which ariſe from the Bile, being more or leſs corrupted with the Acrimony and Viſcidity adhering to the Coats of the Guts: For this Reaſon, thoſe Things afford the moſt Relief which ſcour the firſt Paſſages from that Filth which loads the Blood, and ſo diſturbs the Functions of the Vital Parts.

There is another Poiſon which is bred in the Body it ſelf. This is a Putrefaction of the ſolid or fluid Parts; for nothing is more offenſive to Life, nothing more obnoxious to the Mixture of the Fluids and the Solids, than Putrefaction it ſelf, which may be juſtly eſteem'd their Death. If theſe Things lie in the Paſſages of the Blood, they are ſoon diſcovered by a Languidneſs of the Spirits, a Decay of Strength, Convulſions, Faintings, a feeble Pulſe, and Want of Sleep; as we diſcover in Plagues, Putrid and Autumnal Fevers. After the Lungs of conſumptive Perſons are grown putrid, they corrupt the whole Body, and waſt it away by Degrees, tho' ſlowly, and with gentle Heat; but the Progreſs of Putrefaction is far greater in the fluid, than in the ſolid Parts; therefore there is more Danger, and Application ought to be made with greater Expedition.

Laſtly,

Laſtly, we ſhall ſpeak of that which is moſt deſtructive of Life, which is a *Polypus*, or Coagulation of Blood or Humours; for we have ſaid before, that the Cauſe of Life is ſeated in a continued Motion of the Fluids. Now there is nothing ſo quickly and effectually ſtops the Courſe of the Blood, and is ſo contrary and oppoſite to Life, as the Blood and Humours being conſtiped, and coagulating in the Veſſels. There are many that frequently die ſuddenly of a *Polypus*, or Concretion of Blood in the Veins, or in the Auricles of the Heart; and there are many long and obſtinate Diſeaſes proceeding from a *Polypus*. Hence we meet with Palpitations of the Heart incurable, ſtubborn and contumacious *Aſthma's*, Spitting of Blood, irregular and immoderate Profuſions of the *Menſes*: And we are daily Witneſſes of the vaſt Inconveniencies that follow drinking of cold Liquors when the Body is hot; for the Cold coagulates the *Serum* of the Blood, and preſently interrupts the vital Circuit.

I ſhall from hence proceed to give an Account, 1. Of the Viper, and other poiſonous Animals; 2. The *Tarantula* and Mad Dog; 3. Of poiſonous Minerals; 4. Of poiſonous Plants and Vegetables; 5. Of venemous Exhalations, *&c.*

The Viper has always been ſo notorious for its Venom, that the moſt remote Antiquity made it an Emblem of what is hurtful and deſtructive; nay, ſo terrible was the Nature of theſe Creatures, that they were commonly thought to be ſent as Executioners of Divine Vengeance upon Mankind for enormous Crimes which had eſcaped the Courſe of common Juſtice.

The Symptoms which follow upon the Bite of a Viper, when it faſtens either one or both its greater Teeth in any Part of the Body, are, an acute Pain in the Place wounded, with a Swelling, at firſt red, but afterwards livid, which by Degrees ſpreads farther to the neighbouring Parts, with great Faintneſs, and a quick, tho' low, and ſometimes interrupted Pulſe, great Sickneſs at the Stomach, with bilious convulſive Vomitings, cold Sweats, and ſometimes Pains about the Navel, and (if the Cure be not ſpeedy) Death it ſelf, unleſs the Strength of Nature prove ſufficient to overcome theſe Diſorders; and though it does, the Swelling ſtill continues inflamed for ſome Time; [illegible] in ſome Caſes more conſiderably upon [illegible] abating of the other Symptoms, than at [illegible] Beginning; and often from the ſmall Wo[illegible] runs a ſanious Liquor, and little Puſt[illegible] are rais'd about it; the Colour of the wh[illegible] Skin is changed yellow, as if the Patient h[illegible] the Jaundice.

Theſe Miſchiefs, although different C[illegible] mates, Seaſon of the Year more or leſs h[illegible] the greater or leſs Rage of the Viper, t[illegible] Beaſt it ſelf of a larger or ſmaller Size, a[illegible] conſequently able to communicate more [illegible] leſs Venom, and the like Circumſtance[illegible] may variouſly heighten or abate them, y[illegible] do uſually diſcover themſelves much a[illegible] the ſame Manner in all, unleſs the Bite ha[illegible] pen not to be accompanied with the Effuſi[illegible] of that Liquor which is the main Inſtrument and Cauſe of this violent and ſhocking Diſturbance.

But before I proceed to enquire into the Nature and Manner of acting of this Ju[illegible] it may be worth while to take Notice that this is not made on purpoſe to be deadly and deſtructive to Mankind; but that the true Deſign of it is (though Authors have not regarded it) to perform an Office and Ser[illegible] of ſo great Moment, to the Preſervation [illegible] the Individual, that without it this Creature could not ſubſiſt.

For Vipers live chiefly upon Lizards, Frogs, Toads, Mice, Moles, and the like Animals, which they do not chew, but ſwallow down whole, and they lie in the Stomach; or if that be not big enough to receive them, partly in that, and partly in the *Oeſophagus*, which is membranous, and capable of great Diſtention, till, by the ſalival Juices of thoſe Parts, together with the Help of the Fibres of the Stomach, and the Contraction of the Muſcles of the *Abdomen*, they are gradually diſſolved into a fluid Subſtance, for the Nouriſhment of their Bodies, which is the Work of many Days. This is one Reaſon why theſe Creatures can live ſo long without taking any freſh Food, which I have known them to do three or four Months; as *another* is, that their Blood is a groſſer and more viſcid Fluid than that of moſt other Animals; ſo that there is but a very little Expence of it by Tranſpiration, and conſequently leſs Need of Recruit. This

ot only *Microſcopes* diſcover, but Reaſon aches; becauſe there is but very little muſ-lar Force in the Stomach to comminute e Food, and make a Chyle of fine Parts; d therefore the Blood muſt accordingly be a tough and clammy Conſiſtence. Be-des, the Heart of a Viper has properly but e Ventricle, and the Circulation of the lood is performed after the ſame Manner as is in a Frog and Tortoiſe, in which not ove one Third of it paſſes thro' the Lungs; on which Account its Comminution in em by the Air is proportionably leſſer an in other Animals. Now ſuch a Man-r of Feeding as *this*, does neceſſarily re-ire that the Prey ſhould upon the firſt atching be immediately kill'd, otherwiſe it ere by no Means fit to be let into the Sto-ach; for we are not to think, that the rce of this Part would be alone ſufficient deſtroy it, the Subtilty of a living Crea-re (beſides the Conſideration of the Weak-ſs of the Fibres) being in a great Meaſure le to elude *that*, as indeed we do every ay find live Animals in the Ventricles of hers; and therefore to do *this* is the proper ſe both of their Teeth and their Poiſon; which being deſigned and adapted, it is Wonder if the Viper, this ſame Way by hich it deſtroys its Prey, proves ſometimes ſchievous to any other Creatures beſides, hen it happens to be enraged, or by any ovocation ſtirred up to bite.

The Deſcription of the poiſonous *Fangs*, ir Make, Articulation and Motion, as o of the Glands that ſeparate the yel-wiſh Liquor, and the Bags that contain I ſhall give, together with ſome Anato-cal Obſervations, at the End of this Diſ-urſe.

This venemous Juice it ſelf is of ſo in-nſiderable a Quantity, that it is no more n one good *Drop* that does the Execution; d for this Reaſon Authors have contented mſelves with Trials of the Bite upon ſe-ral Animals, never eſſaying to examine Texture and Make of the Liquor it ſelf; which Purpoſe I have oftentimes, by-lding a Viper advantagiouſly, and en-ing it till it ſtruck out its Teeth, made it bite upon ſomewhat ſolid, ſo as to void Poiſon; which carefully putting upon a Glaſs Plate, I have, with a Microſcope, (as nicely as I could) view'd its Parts and Com-poſition.

Upon the firſt Sight, I could diſcover no-thing but a Parcel of ſmall Salts nimbly floating in the Liquor; but in a very ſhort Time the Appearance was changed, and theſe ſaline Particles were now ſhot out as it were into *Cryſtals* of an incredible Tenuity and Sharpneſs, with ſomething like Knots here and there, from which they ſeem'd to proceed; ſo that the whole Texture did in a Manner repreſent a *Spider*'s *Web*, though in-finitely finer and more minute; and yet withal ſo rigid were theſe pellucid *Spicula* or *Darts*, that they remained unalter'd upon my Glaſs for ſeveral Months.

I have made ſeveral Trials with this *Juice*, in order to find out under what Tribe of Salts theſe Cryſtals are to be ranged; and not without ſome Difficulty, by reaſon of the minute Quantity of the Liquor, and the Hazard of Experiments of this Nature, have plainly ſeen that it does, as an *Acid*, turn the blue Tincture of *Heliotropium* to a red Colour.

I did not ſucceed ſo well in mixing it with Syrup of Violets, and yet it did really ſeem to induce in this a *reddiſh Hue*; but I am very certain it did not at all change it to a *greeniſh* Colour, as it would have done if any ways *alcalious*.

This may ſuffice, in their own Way of arguing, to convince thoſe Gentlemen, who (without the Aſſiſtance of any Experiments) meerly to ſerve an *Hypotheſis* which they have too fondly taken up, have with great Aſſurance told the World, that the Viperine Venom is an *Alcali*, and conſequently to be cured by *acid* Remedies. But it is far more eaſy to ſpin out a falſe Notion into precarious Reaſonings, than to make faithful Experiments, and fairly improve them by juſt and neceſſary Conſequences.

To proceed, this Diſcovery agrees very well with a Relation communicated by an Ingenious Perſon to Dr. *Tyſon*, which does ſo much illuſtrate this Matter, that I ſhall tranſcribe it in his own Words, out of the before-cited *Philoſophical Tranſactions*. He ſays then, That being in the *Indies*, there came to him an *Indian* with ſeveral Sorts of

Serpents, offering to ſhew him ſome Experiments about the Force of their Poiſon: Having therefore firſt pull'd out a large one, the *Indian* told him this would do no Harm; and making a Ligature on his Arm, as in letting Blood, he expoſed it naked to the Serpent, being firſt irritated to make him bite it; the Blood that came out of the Wound made by his Teeth, he gathered with his Finger, and laid it on his Thigh, till he had got near a Spoonful: After this he takes out another called *Cobra de Capelo*, which was leſſer, and inlarges much upon the Greatneſs of his Poiſon; to ſhew an Inſtance of it, graſping it out about the Neck, he expreſſes ſome of the Liquor in the Bags of the Gums, about the Quantity of half a Grain, and this he puts to the coagulated Blood on his Thigh, which immediately put it into a great *Fermentation*, and working like *Barm*, changed it into a *Yellowiſh* Liquor.

This I ſay does well enough accord with what we have been advancing concerning the Nature of this *Juice*; for Mr. *Boyle* has long ſince proved by Experiments, that there is nothing of Acid in human Blood; and Doctor *Pitcarn* has demonſtrated, that the *Acid Subſtances* of Vegetables taken into the Stomach, are, by the Action of this Part, the Lungs and Heart, when they come into the Blood Veſſels, turn'd to *Alcalious*; ſo that the Arterial Fluid muſt neceſſarily be conſidered as an *Alcali*; and therefore, according to the known Principles of Chymiſtry, its Mixture with ſuch a Liquor as we have diſcovered the Viperine *Sanies* to be, will always exhibit ſome ſuch Appearance as this now related.

But not to engage any farther in theſe Sort of Controverſies, we may perhaps from the foregoing Obſervations receive ſome Light in order to underſtand the Nature and Reaſon of all thoſe Symptoms which attend the Bite of this Creature. For the pungent Salts of this Venom, when with Force thrown into the Wound, will not only, as ſo many *Stimuli*, irritate and fret the ſenſile Membranes, whereupon there neceſſarily follows a greater Afflux than ordinary of the Animal Juices that Way (as is manifeſt from the *Bellinean* Doctrine, *De Stimilis*) ſo that the wounded Part muſt be ſwelled, inflamed, livid, *&c.* but alſo theſe *Spicula* being mix'd with the Blood, will ſo disjoin and diſunite the Parts of it, that its Mixture muſt be quite alter'd; and from the various *Cohæſion* of its *Globules* will ariſe ſuch different Degrees of *Fluidity* and *Impulſe* towards the Parts, *&c.* from what this Liquor had before, that its very Nature will be changed, or, in the common Way of Speaking, it will be truly and really *Fermented*.

To underſtand aright how all this is done, it is neceſſary to hint ſomewhat concerning the Nature of *Fluids* in General, and thoſe Alterations in them which we call *Fermentations*; for I ſhall retain this known Word, though in the proper Senſe in which 'tis commonly uſed, there can be no *Fermenting* of the Liquors in the Animal Body.

And here I muſt refer to the Treatiſe of *Bellini de Fermentis*, who has with great Clearneſs ſhewn, that there is in all Fluids, not only a ſimple *Contact* of their Parts, but alſo a *Niſus in Contactum*, or *Cohæſion*, and this of a certain *Degree* or *Force*, and beſides, of a particular *Direction*; which is indeed, tho' expreſs'd in other Words, the ſame with the Attraction of the Particles one to another. This Mr. *Newton* has demonſtrated to be the great Principle of Action in the Univerſe, has taught us the Laws of it in the greater Quantities and Collections of *Matter*; and he who rightly ſtudies his Philoſophy will underſtand, that the ſame obtains in the moſt minute and fineſt Corpuſcles, which do unite into Bodies of different *Solidity* and *Make*, according to the Degree with which they do mutually *attract* each other, and to the *Superficies* by which, when drawn, they do *touch* and *adhere*. To this if we add a *Preſſion* of the ſeveral Parts of the Fluid every Way, and conſider withal, that this *Uniform* Attraction of the Parts to one another muſt be variouſly changed by the different Attraction of heterogeneous Bodies mix'd with them, we have the great Principles of all Fluids, upon which their ſeveral *Phænomena* do depend.

And hence it follows, that whatſoever *Power* is ſufficient to make a Change in this Attraction or Cohæſion of the Parts, makes an

an Alteration of the Nature of the Fluid; that is, as the Chymiſts expreſs it, puts it into a *Fermentation*. And if any one ſhall think it neceſſary to enquire into the particular Manner of producing ſuch an Effect, we may perhaps, in ſo abſtruſe a Matter, not improbably conjecture thus; That our Blood conſiſting chiefly of Two Parts, a ſimple *Lymph*, and an infinite Number of ſmall *Globules*, containing a very ſubtle and elaſtick Fluid; theſe acute Salts, when mingled with it, do prick thoſe Globules or *Veſiculæ*, and ſo let out their impriſoned active Subſtance, which expanding it ſelf every Way, muſt neceſſarily be the Inſtrument of this ſpeedy Alteration and Change. From ſuch an *Hypotheſis* as this, (and, it may be, not very eaſily from any other) we may account for many of the ſurprizing Phænomena in the Fermentations of Liquors; and as precarious as it ſeems, its Simplicity and Plainneſs, and Agreement with the forementioned Doctrine, will, I believe, recommend it before any other, to thoſe who are not unacquainted with *Geometrical* Reaſonings. But I wave theſe Conſiderations at preſent, and ſhall only add one Remark or two with Relation to the Purpoſe in Hand, and ſo proceed.

In the firſt Place then, we may from this *Theory* learn, how it comes to paſs that ſo ſmall a Portion of Juice ſhould infect ſo great a Quantity of Liquor; for in order to do this, it is not neceſſary that the Venom ſhould be at the very firſt mix'd with all its Parts, but it is ſufficient that it prick ſome of the *Bladders*, and the elaſtick Matter of theſe being let out, will be a nimble *Vehicle* to the acute Salts, and not only by its Activity diſperſe them through the Fluid, but reſtore to them their decreaſing *Force*, and thus continue their Effects, till a great Part of the Liquor undergoes, at leaſt in ſome Degree, the like Alteration.

And this will the more eaſily happen in the preſent Caſe, becauſe the *Force* with which this Poiſon is thrown into the Blood, as appears from the Mechaniſm of the diſcharging Organs, is very great, and conſequently its Effects will be proportionably violent, or the Miſchief more large and diffuſed.

The Want of this may be one Reaſon why the Experiment of firſt making a Wound in the Fleſh with any ſharp Inſtrument, and then dropping in the *Sanies*, may not always ſucceed ſo well in killing Animals, as one would from the preceding Doctrine be ready to expect. Tho' if ſome Amends be made for this Defect, by taking a greater Quantity of the Juice, and carefully inſtilling it, it proves equally Fatal this Way, as when immediately diſcharged from the Viper it ſelf. Thus it might happen that thoſe Trials of this Kind, which were happily made by Sr. *Redi*, might not however convince Mr. *Charas*, in as much as there is oftentimes a great deal of Difference in the Event of Experiments, when made with Purpoſe, and a Deſign that they ſhould ſucceed, and when timorouſly and cautiouſly managed, leſt they ſhould unluckily overthrow a darling *Hypotheſis*.

The other Obſervation I ſhall draw from the foregoing Theory, is this, That it appears from hence what a vaſt *Variety* there may be in the Fermentations even of one and the ſame Fluid; for theſe being no other than *Changes* made in the *Cohæſion* of the compounding Particles, are capable of as many Alterations as *Motion* in its *Degrees* and *Directions* can admit of, which are really infinite.

This I mention with Regard to ſome of the following *Eſſays*, in which, if we aſcribe many Symptoms, ſeemingly very different, to a Ferment rais'd in the Blood, it may be conſidered, that the Nature of this Cauſe is ſuch, as according to the ſeveral Properties of the *Primum Agens*, or *Fermenting Power*, to bear by far more Varieties than any one can be aware of.

To return to the Viper; the Effects of ſuch an Agitation of the Blood, as we have been deſcribing, muſt not only be whatever are the Conſequences of a diſturbed *Circulation*, and irregular and interrupted *Secretion* of the Spirits, as low Pulſe, Faintings, Sickneſs, Palpitation of the Heart, convulſive Vomitings, Tremblings of the *Body*, *&c.* but alſo the *Texture* of this Fluid being thus broken, thoſe Parts of it which are of the ſloweſt Motion, and greateſt Viſcidity, will be eaſily ſeparated from the others; ſuch they are which, when united together, do compound

the *Bile*; and therefore these will tinge the capillary Vessels, and fine *Ducts* in the Skin, with a yellowish Colour; that is, will induce an *Icterus*, or Jaundice.

For it is not only (if at all *Primarily*) from an Obstruction of the *Biliary Canals* that this Symptom does proceed, but also from any Cause whatsoever, which either destroys the saline Part of the Bile, by the Means of which its Oil is kept mix'd with the Water of the Blood, or else increases the oily and sulphureous Part to that Degree, that tho' it be duly impregnated with Salt, yet the watery Part of the Blood, which can only take up a certain Proportion of it, being already *Saturated*, can receive no more; or lastly, does, by *disuniting* the compounding Particles of the Blood, alter that *Intestine* Motion and Agitation which is necessary to carry along thro' the Vessels, together with the more volatile Parts, those which are more clammy and glutinous. For in all these Cases 'tis plain that the bilious Corpuscles must be *precipitated* upon those Parts of the Body where there is least Motion, that is, upon the extream Superficies.

And tho' this Theory may perhaps appear extravagant, because new and uncommon, yet it will not, I believe, seem ill grounded or irrational to those who understand the Doctrine of the *Mixture* of heterogene Fluids and their *Separation*; and who withall know, that the Vessels are rarely obstructed, unless it be from the Fault of the Liquid they carry, and consequently that a Defect in the Bile it self must be (excepting some extraordinary Cases) antecedent to the Obstruction of the Biliary Ducts.

In short, the different Cure of this Disease confirms these Notions; for an *Icterus* from the first Cause assigned, which is generally owing to a sedentary Life, Want of Exercise, *&c.* and attended with an extreme Costiveness and white *Faces*, is cured by volatile, acrimonious, and bitter Salts. From the Second produced oftentimes by drinking strong Liquors, Spirits, *&c.* and accompanied with a *Diarrhœa*, partly by diluting and temperating, partly by Stomachic and strengthening Medicines. As the last Species of it (for the Sake of which we have mentioned the other) is removed by such *Antidotes* as overcome and destroy the venemous Ferment, corrupting the Blood, and breaking its *Compages*. But to have hinted these Things may abundantly suffice for the present.

We must however take Notice, That tho' the *main* Alterations made by this Poison be in the Fluid of the Arteries, *yet* that *That* of the Nerves may hereby be considerably *changed* too; for *This* consisting, as well as the Blood, of differing Parts, and being dispersed in small *Tubes* all over the Body, is not only very capable of *various* Degrees of *Force*, *Impulse*, *&c.* but *undulating* continually towards the Brain, and being the chief Instrument of Motion and Action, may perhaps sometimes more immediately convey the Mischief to the sensile Membranes, and thus be the Cause of those violent Pains, Convulsions, Sickness, *&c.* with which those who are bitten are presently seiz'd.

Many are the Experiments I could relate to evince the Truth of this Reasoning concerning the viperine Venom, which do entirely agree with those made by Sr. *Redi*, whose Judgment and Sincerity in Observations of this Nature no Body ever called in Question, till Monsieur *Charas* having espous'd a Notion, that this Poison does not lie in the Yellow Liquor of the Gums, but in the enraged Spirits of the Viper, raised new Difficulties about the Success of some Trials made in *France*, endeavouring thereby to invalidate the Force and Authority of those made in *Italy*.

I shall therefore, in order to put this Matter out of all Doubt, mention two or three Experiments made by Doctor *Areskine*, when at *Paris*, that it may appear how defective those of Mr. *Charas* are, and that the Difference of the Climate does not (as some began to imagine) make any considerable Alteration in the Effects of this Venom, or its Manner of Killing.

First then, having got a large Female Viper, he made it to bite Six Pigeons, one after another; the First and Second that were bit, died within about half an Hour, one a little Time before the other; the Third lived about two Hours; the Fourth seem'd to be very sick, but recovered; the Fifth and Sixth were

were no more hurt than if they had been prick'd with a Pin or Needle.

Then he cut off the Head of a brisk Viper, and let it lie twenty four Hours, with the Fangs of which he wounded one Pigeon in the Breaſt, and another in the Thigh, which both expired as ſoon after as if they had been bit by a living Viper. After this, having got a great many Vipers together, he made them bite upon a Piece of Glaſs of a cylindrical Figure, by this Means preſerving the Yellow Juice which they emitted, and ſlightly wounding two Pigeons, he firſt let the Bleeding be ſtopped, then put ſome of this Liquor into the Wounds, upon which both the Pigeons died about two Hours after.

The ſame ingenious Perſon tells me, that Monſieur *du Verney* made not only theſe, but alſo ſeveral other Experiments of the ſame Nature, in the *Royal Academy*, with the like Succeſs.

Theſe Proofs are ſo convincing and full, that no one, I think, can deſire more; but they will receive yet a farther Confirmation from the *Apparatus* or Mechaniſm of the Organs, with admirable Nicety contrived for the Diſcharge of this Venom, of which more by and by.

Nor is it any Objection againſt all *This*, that the *Liquor* is innocent and harmleſs in the Mouth or Stomach of any one, ſo as that it may be ſafely taſted or ſucked out of the Wound, and ſwallowed; for, as we obſerved before, that many *Acid* Subſtances taken into the Stomach are by the Action of that Part turned to *Alkalious*, ſo there is no Queſtion but theſe Saline *Spicula* are, partly by the Muſcular Force of the Fibres, partly by the Salival Juice, all broken and diſſolved; or if any can paſs into the Inteſtines, the Balſam of the *Bile* will be an *Antidote* for them; the Reaſon of which will appear when we come to the Cure.

In the mean Time it may not be amiſs to remark, That even the Ancients ſeem to have known thus much concerning the Nature of this Poiſon: Of this, *Galen* gives us Teſtimony in ſeveral Places; particularly in his Book *de Temperamentis*, where he takes Notice, that *nothing has the ſame Power upon the humane Body outwardly as inwardly: Thus* (ſays he) *neither the Venom of the Viper, nor of the Aſp, nor frothy Spittle of the Mad Dog, are alike miſchievous when they fall upon the Skin, or enter into the Stomach, as when outward communicated by a Wound.*

Of Poiſonous Creatures.

AS the Viper is hurtful by inſtilling a liquid Poiſon into the Wound made by its Teeth; ſo likewiſe are all venemous Creatures whatſoever, whether they bite or ſting, tho' there be ſome Difference in the Contrivance of their Organs, miſchievous after much the ſame Manner, and moſtly for the ſame good Uſe and Purpoſe, that is, in order to kill their Prey.

This will fully appear in examining the Inſtruments of Death in ſeveral of them: Firſt then, the *Spider*, which lives upon Flies, Waſps, and ſuch like *Inſects*, is provided with a hooked *Forceps*, placed juſt by the Mouth, very ſharp and fine; with this he pierces the Fleſh of little Creatures caught in his *Web*, and at the ſame Time infuſes a Juice into the Puncture, by which Means the Animal being killed, he ſucks out the Moiſture from the Body, and leaves it a dry husky Carkaſs.

Mr. *Van Leewenhoek*, in his Account of *Spiders* lately publiſhed, has, together with the other Parts, by the Help of his Glaſſes, deſcrib'd theſe *Weapons*, which he finds to lie couched on each Side the Mouth, in a Row of Teeth, till they are raiſed to do Execution. Theſe Rows of ſmall *Teeth* are deſigned to hold the Prey, that it may not eſcape the Force of the Bite. And in the convex Part, towards the Point of each *Claw*, he has delineated a little Aperture or *Slit*, thro' which he ſuppoſes the Poiſon iſſues out at the ſame Time the Wound is made.

This *Situation* and *Motion* of theſe Parts I have ſeveral Times view'd, but was never able

able to discern the *Exit* or Opening; which, having a just Deference to the Industry and Application of so nice an Observer in Things of this Nature, I at first imputed to my own Unskilfulness in such Enquiries, knowing my *Microscope* to be very good; till at last, after repeated Trials, I very plainly saw, That nothing dropped out of the *Claws*, which were always dry while the Spider bit, but that a short white *Proboscis* was at the same Time thrust out of the Mouth, which instilled a *Liquor* into the Wound.

Then I concluded, That Mr. *Leewenhoek* had delineated the *Apertures* in these *Weapons* only from the *Analogy* which he thought they must bear to the Viperine *Fangs*, the *Sting* of the *Scorpion*, *&c.* And I was confirmed in this Opinion by examining a *Claw* of the great *American* Spider, describ'd (tho' but lamely) by *Piso*, and called *Nhamdu*: This was given me by Mr. *Pettiver*, and being above fifty Times bigger than that of the largest *European* Spider, if there had been any Slit in it, my Glass would no Doubt have discover'd it; but yet I found it to be quite solid.

And indeed the Quantity of *Liquor* emitted by our common Spiders, when they kill their Prey, is visibly so great, and the wounding *Weapons* so minute, that they could contain but a very inconsiderable Portion thereof, if it were to be discharged that Way.

To this Purpose, I remember Mr. *Boyle* somewhere tells a Story of a Person blinded by a Spider dropping its Venom into his Eye, which, tho' it can hardly find Credit with some, is however confirmed by what *Piso* relates of his *Nhamdu*, *viz.* That in catching it great Heed is to be taken, lest its Poison fall into the *Eye*; this causing a total Loss of the *Sight*.

What Mr. *Leewenhoek* observes the Enmity these Creatures bear to one another, I have often seen; for if Four, Five, or more, be put together into a Glass, they immediately fall to *Fighting* with all the Fury imaginable: *Limbs* struck off are usually the *Præludes* to the terrible Slaughter, which continues till all are killed, the *surviving Conqueror* himself most commonly dying of his Wounds.

The *Weapons* of Mischief in the *Scolopendra* are much the same with those of the Spider, only larger. One of these Creatures I had brought to me alive out of a Ship which came from the *East-Indies*, where *Bontius* says their Bite is so painful that it makes People almost mad, but it died before I had an Opportunity of making Trial of its Poison; however, I very diligently looked upon the Claws, and found them to have no more *Cavity* than is necessary for the Insertion of their Muscles, nor any *Exit* or Out-let towards their *Apex*; these therefore serve only to *pierce* the Flesh, and the Venom is infused from a *Proboscis* out of the Mouth; tho' this I could not very well discern, because the Parts had been kept too long dry before I examined them.

The Case is much the same with *Stinging* Animals; of these the *Scorpion* is the chief, whose *Virus* in different Countries is more or less dangerous, according as 'tis exalted by various Degrees of *Heat*: Thus in *Africa* particularly its Effects are so dreadful, that as *Joann. Leo* tells us, the Town of *Pescora* there is in a Manner left desolate by the Inhabitants in the Summer-time, by reason of the great Abundance of these Creatures, certain Death following their *Sting*.

Some of this deadly Kind (the same, tho' not so large with that in the *East-Indies*, of which *Swammerdam* has given a very accurate Description aud Figure) Sr. *Redi* had sent him from *Tunis*; and it being *November*, irritated them to *sting* Pigeons, Pullets, *&c.* without any bad Effect at all of their *Poison*; but upon the approaching Spring, one of them which had been kept all the Winter, nay eight Months, without any Food, and the Wound of whose Sting before was harmless, stung to Death two Pigeons successively; but a third and Fourth wounded in like Manner suffered no Hurt: Yet having let the *Scorpion* rest all Night, he killed another Pigeon the next Morning.

At the *Point* of the *Sting* he very often could discern a small Drop of white *Liquor*, which when the Wound was made entered into the Flesh.

As this *Liquid Venom* is either not separated from the Blood into the Cavity of the Sting during the Cold of Winter, or at least the

rpion wants Strength at that Time to ow it out with Force and Energy; ſo n in the hot Months, after it is exhauſted two or three *Attacks*, the *Sting* is no ger hurtful, till the Expence of this *Juice* ecruited by Time.

Tis very remarkable concerning this *Inſect*, at an ingenious Gentleman, who lived eral Years in *Barbary*, told me he had ny Times tried; that if it be ſurrounded h a Circle of *Burning Coals*, it does, upon Senſe of the *Heat*, turn it ſelf violently y Way to make an Eſcape; but finding mpoſſible, and the *Pain* from the Fire inſing, it ſtrikes it ſelf twice or thrice with *Sting* on the *Back*, and immediately dies he Wounds.

Others may make what Reflections they ſe on this *Self-Murder*, it is to me beyond all Diſpute ſufficient to decide the *Conerſy* between Writers, whether poiſonous mals of the ſame *Species* can kill each r. Which is not only confirmed by t we before obſerved of the *Spider*, but kewiſe true of *Vipers*; for Doctor *Her*- bringing from the *Indies* Three of the *as de Capelo* all in one Glaſs, Two of were killed in the Voyage by *Fight-*

As the *Viperine Venom* is the *Quinteſſence* and moſt active Part of thoſe *Animal Juices* with which the Viper is nouriſhed, ſo is alſo that of the Scorpion; for this Inſect lives chiefly upon *Locuſts*, *&c.* and the ſame Perſon from *Barbary* inform'd me, that ſeeing oftentimes *Locuſts* ſticking up in the Ground as if they were ſet there, by looking he found that ſome Part of them was always eat away, and that theſe Places were the *Holes* of *Scorpions*, who had dragg'd their Prey thither, and fed on it as they had Occaſion.

In like Manner as the *Axungia Viperina* cures the Bite of the Viper, ſo alſo the *Oleum Scorpionum*, or Oil in which Scorpions have been infuſed, is a preſent Remedy for the Sting of this Creature.

The Mechaniſm of the Sting of a *Bee*, Doctor *Hooke* has very accurately deſcribed. One may with the naked Eye ſometimes ſee it diſcharge the *Venom*; and in this, by the Help of a *Glaſs*, I can eaſily diſcover a great Number of minute *Salts* floating.

And indeed, this *Apparatus* or Contrivance is ſo univerſal, that we find even in *Vegetables* ſomething analogous hereunto; for the laſt mentioned Author has ſhewn us, that the pricking Points of *Nettles* do at the ſame Time they pierce the Skin inſtil a Venemous *Juice* into the Wound.

Of the Bite of the Tarantula, *and* Mad Dog.

Join theſe Two Poiſons together, beauſe tho' they differ very much in their effects, yet both do agree in this, that induce a particular *Delirium ſui Generis*, ded partly with *Maniacal*, partly with *ncholy* Symptoms.

he *Tarantula* (of which the Figure may een in *Baglivy*'s Diſſertation) is a *Spider pulia* of the *Octonocular* Kind; that is, at Species that has eight Eyes, and ſpins s; it has eight Legs, four on each Side, n each Leg three Joints; from the Mouth ed two Darts, in Shape juſt like to a ed *Forceps*, or Crab's Claws; theſe are , and very ſharp, ſo that they can eaſily e the Skin; and between theſe and the Fore-Legs there are two little Horns, which I ſuppoſe do anſwer to thoſe Bodies called from their Uſe in *Flies* the *Feelers*; becauſe as they do, ſo this Creature is obſerved to move 'em very briskly when it approaches its Prey.

This, as other Spiders do, propagates its *Species* by laying Eggs, which are very numerous; ſo that there are found ſometimes in the Female, when diſſected, a Hundred or more, and theſe are hatched partly by the Heat of the Mother, partly by that of the Sun, in about 20 or 30 Day's Time.

There is alſo a Spider of the like Nature with the *Tarantula* in the *Weſt-Indies*, which

Fr.

Fr. Hernandez deſcribes by the Name of *Hoitztocatl*, or the *Pricking Spider*; and ſays, that its Bite induces Madneſs.

In the Summer Months, eſpecially when the Heats are greateſt, as in the Dog-Days, the *Tarantula*, creeping among the Corn in the Fields, bites the Mowers and Paſſengers; in the Winter it lurks in Holes, and is ſcarcely ſeen; and if it does bite then, it is not venemous, neither does it induce any ill Symptoms.

But in the hot Weather, altho' the Pain of its Bite is at firſt no greater than what is cauſed by the Sting of a Bee, yet the Part quickly after is diſcoloured with a livid, black, or yellowiſh Circle, and raiſed to an inflam'd Swelling; the Patient within a few Hours is ſeized with a violent Sickneſs, Difficulty of Breathing, univerſal Faintneſs, and ſometimes Trembling, with a Weakneſs of the Head; being asked what the Ail is, makes no Reply, or, with a querulous Voice, and melancholy Look, points to his Breaſt, as if the Heart was moſt affected.

During this mournful Scene, all the uſual *Alexipharmick* and *Cordial Medicines* are of no Service; for notwithſtanding their repeated Uſe, the Patient growing by Degrees more melancholy, ſtupid, and ſtrangely timorous, in a ſhort Time expires, unleſs *Muſick* be called to his Aſſiſtance, which alone, without the Help of Medicine, performs the *Cure*.

For at the firſt Sound of the *Muſical Inſtrument*, altho' the Sick lie as it were in an Apoplectick Fit, they begin by Degrees to move their Hands and Feet, till at laſt they get up, and fall to Dancing with wonderful Vigour, at firſt for three or four Hours, then they are put to Bed, refreſhed from their Sweating for a ſhort Time, and repeat the Exerciſe with the ſame Vehemence, perceiving no Wearineſs or Weakneſs from it, but profeſſing they grow ſtronger and nimbler the more they dance.

At this Sport they uſually ſpend Twelve Hours a Day, and it continues three or four Days; by which Time they are generally freed from all their Symptoms, which do nevertheleſs attack 'em again about the ſame Time the next Year: and if they do not take Care to prevent this Relapſe by Muſick, they fall into a *Jaundice*, Want of Appetite, univerſal Weakneſs, and ſuch like Diſeaſes, which are every Year increaſed, if Dancing be neglected, till at laſt they prove incurable.

As Muſick is the common *Cure*, ſo they who are bitten are pleaſed ſome with one Sort of it, ſome with another; one is raiſed with a Pipe, another with a Tymbrel; one with a Harp, another with a Fiddle; ſo that the Muſicians make ſometimes ſeveral Eſſays before they can accommodate their Art to the Venom; but this is conſtant and certain, notwithſtanding this Variety, that they all require the quickeſt and briskeſt Tune, and are never moved by a ſlow dull *Harmony*.

While the *Tarantati*, or Affected, are Dancing, they loſe in a Manner the Uſe of all their Senſes, like ſo many Drunkards, do many ridiculous and fooliſh Tricks, talk and act obſcenely and rudely, take great Pleaſure in playing with Vine-Leaves, naked Swords, red Cloths, and the like; and on the other Hand can't bear the Sight of any Thing black; ſo that if any By-ſtander happen to appear in that *Colour*, he muſt immediately withdraw, otherwiſe they relapſe into their Symptoms with as much Violence as ever.

It may afford ſome Light towards underſtanding the Nature of this Poiſon, to obſerve that *Apulia* is the hotteſt Part of all *Italy*, lying *Eaſtward*, and having all the Summer long but very little Rain to temper the Heats, ſo that the Inhabitants, as one of that Country obſerves, do breathe an Air, as it were, out of a fiery Furnace; hence their Temperament is dry and aduſt, as appears by their being generally lean, paſſionate, impatient, ready to Action, quick-witted, very ſubject to inflammatory Diſtempers, Phrenſies, Melancholy, and the like; upon which Account there are more mad People in this than in all the other Parts of *Italy*; nay what in other Countries is but a light Melancholy, ariſes here to a great Height; for Women in a *Chloroſis* do ſuffer almoſt the ſame Symptoms as Perſons poiſoned by the *Tarantula* do, and are cured the ſame Way; and in like manner the Venom of the *Scorpion* does here, in Effects and Cure, agree very much with that of this *Spider*.

From all this Hiſtory it ſufficiently appears, hat thoſe that are bitten by a *Tarantula*, do hereupon become *Delirious*; and that, in rder to account for their ſurprizing Symp-oms, the Nature of a *Delirium*, from which any of them proceed, ought to be under-ood.

Such is the Conſtitution of the *Humane Oeconomy*, that as upon the Impreſſion of out-ard *Objects* made upon the *Organs*, and by he Fluid of the Nerves conveyed to the *com-on Senſory*, different *Species* are excited there, nd repreſented to the Mind; ſo likewiſe pon this Repreſentation, at the Command nd Pleaſure of the Soul, Part of the ſame luid is determin'd into the Muſcles, and ixing with the arterial Blood there, per-orms all the Variety of voluntary Motions nd Actions.

This Order has been always ſo conſtant n us, that at length, by a Kind of natural abitude, without the Intervention of the aſoning Faculty, Repreſentations made to e Mind do immediately and neceſſarily pro-uce ſuitable Motions in the bodily Organs. hen therefore theſe Repreſentations are ir-gular, the Actions conſequent to them muſt ceſſarily be ſo too.

This being premis'd, it may perhaps be obably ſaid, that a *Delirium* is the Repre-ntation and various Compoſition of ſeve-al *Species* to the Mind, without any Order Coherence; together, at leaſt moſt com-only, with irregular, or, as it were, unde-gned Motions of the Body; that is, ſuch wandring and irregular Motion of the rvous Fluid, whereby ſeveral Objects are reſented to the Mind, and upon this Re-ſentation divers Operations performed by Body, though thoſe Objects are not im-eſs'd upon the Organs, nor thoſe Opera-ns or Motions deliberately commanded by Soul.

The Mind indeed is the firſt Principle of muſcular Motion; but in ſuch Caſes as eſe, its Promptitude to Action or Habit ng ſo great, it is in a Manner ſurpriz'd, d cannot recover it ſelf, after the Spirits with violent Force determined purſuant the Repreſentation of the *Species*. For as, the former State of Things, a Man is ſaid act rationally; ſo this latter Caſe is called *Perturbation of Mind*, that is, a *Delirium*; tho' it is very manifeſt, that in Reality the Defect is not in the *rational*, but *corporeal* Part; ſuch *Species* being really preſented to the Mind, upon which, by the Order of our Conſtitution, ſuch Motions ought to follow in the Body.

Thus, for Inſtance, if the Liquor of the Nerves is, without the Preſence of any Thing hurtful, put into a Motion like unto that which a painful Impreſſion makes in it, the ſame bodily Actions muſt enſue as proceed from Fear, Anger, or the like Paſſion, determining the Spirits towards the muſcular Parts; and a By-ſtander, who ſees no Reaſon for ſuch a Repreſentation made to the Mind, will preſently conclude that the Perſon thus acting acts without or beſides his Reaſon, that is, is *Delirious*; eſpecially if the Hurry and Confuſion of the Spirits be ſuch, that not only one, but ſeveral different *Species* be at the ſame Time preſented to the Mind; for a Man in this Caſe may act the Part of one joyful, angry, timorous, or the like, without any appearing Reaſon, and all this almoſt in the ſame Moment of Time.

In one Word, *Deliria* are the *Dreams* of thoſe who are awake; and as theſe in us ſleeping are infinitely various, and wonder-fully compounded, and all from the ſame common *Cauſe*, diverſely preſſing the Orifices of the Nerves, and thus making different *Repercuſſions* of their Fluid; and as we all know that this Confuſion making the Re-preſentation of ſeveral *Species* to the Mind, there do hereupon follow, tho' the Body ſeem now at Reſt and in perfect Repoſe, ſuch Mo-tions in the Organs as are uſually the Effect of the arbitrary Determination of the Spi-rits thither; ſo we are now to inquire what Alteration of the Body, made by this Venom, can be the Occaſion of this Diſorder and Tumult in the nervous Fluid, which excites in the Party infected ſuch ſurprizing, and al-moſt contradictory, Repreſentations.

Moſt of the Symptoms of thoſe who are bitten by the *Tarantula* are at the firſt, that is, before they riſe to a *Delirium*, plainly the ſame with thoſe which the Bite of a Viper induces; without Doubt therefore, as we have before obſerved of the common Spider, that it pierces the Fleſh with its hooked *For-ceps*, and at the ſame Time inſtils from the *Proboſcis* in the Mouth a liquid Venom into

Fr. Hernandez deſcribes by the Name of *Hoitztocatl*, or the *Pricking Spider*; and ſays, that its Bite induces Madneſs.

In the Summer Months, eſpecially when the Heats are greateſt, as in the Dog-Days, the *Tarantula*, creeping among the Corn in the Fields, bites the Mowers and Paſſengers; in the Winter it lurks in Holes, and is ſcarcely ſeen; and if it does bite then, it is not venemous, neither does it induce any ill Symptoms.

But in the hot Weather, altho' the Pain of its Bite is at firſt no greater than what is cauſed by the Sting of a Bee, yet the Part quickly after is diſcoloured with a livid, black, or yellowiſh Circle, and raiſed to an inflam'd Swelling; the Patient within a few Hours is ſeized with a violent Sickneſs, Difficulty of Breathing, univerſal Faintneſs, and ſometimes Trembling, with a Weakneſs of the Head; being asked what the Ail is, makes no Reply, or, with a querulous Voice, and melancholy Look, points to his Breaſt, as if the Heart was moſt affected.

During this mournful Scene, all the uſual *Alexipharmick* and *Cordial Medicines* are of no Service; for notwithſtanding their repeated Uſe, the Patient growing by Degrees more melancholy, ſtupid, and ſtrangely timorous, in a ſhort Time expires, unleſs *Muſick* be called to his Aſſiſtance, which alone, without the Help of Medicine, performs the *Cure*.

For at the firſt Sound of the *Muſical Inſtrument*, altho' the Sick lie as it were in an Apoplectick Fit, they begin by Degrees to move their Hands and Feet, till at laſt they get up, and fall to Dancing with wonderful Vigour, at firſt for three or four Hours, then they are put to Bed, refreſhed from their Sweating for a ſhort Time, and repeat the Exerciſe with the ſame Vehemence, perceiving no Wearineſs or Weakneſs from it, but profeſſing they grow ſtronger and nimbler the more they dance.

At this Sport they uſually ſpend Twelve Hours a Day, and it continues three or four Days; by which Time they are generally freed from all their Symptoms, which do nevertheleſs attack 'em again about the ſame Time the next Year: and if they do not take Care to prevent this Relapſe by Muſick, they fall into a *Jaundice*, Want of Appetite, univerſal Weakneſs, and ſuch like Diſeaſes; which are every Year increaſed, if Dancing be neglected, till at laſt they prove incurable.

As Muſick is the common *Cure*, ſo they who are bitten are pleaſed ſome with one Sort of it, ſome with another; one is raiſed with a Pipe, another with a Tymbrel; one with a Harp, another with a Fiddle; ſo that the Muſicians make ſometimes ſeveral Eſſays before they can accommodate their Art to the Venom; but this is conſtant and certain, notwithſtanding this Variety, that they all require the quickeſt and briskeſt Tunes, and are never moved by a ſlow dull *Harmony*.

While the *Tarantati*, or Affected, are Dancing, they loſe in a Manner the Uſe of all their Senſes, like ſo many Drunkards, do many ridiculous and fooliſh Tricks, talk and act obſcenely and rudely, take great Pleaſure in playing with Vine-Leaves, naked Swords, red Cloths, and the like; and on the other Hand can't bear the Sight of any Thing black; ſo that if any By-ſtander happen to appear in that *Colour*, he muſt immediately withdraw, otherwiſe they relapſe into their Symptoms with as much Violence as ever.

It may afford ſome Light towards underſtanding the Nature of this Poiſon, to obſerve that *Apulia* is the hotteſt Part of all *Italy*, lying *Eaſtward*, and having all the Summer long but very little Rain to temper the Heats, ſo that the Inhabitants, as one of that Country obſerves, do breathe an Air, as it were, out of a fiery Furnace; hence their Temperament is dry and aduſt, as appears by their being generally lean, paſſionate, impatient, ready to Action, quick-witted, very ſubject to inflammatory Diſtempers, Phrenſies, Melancholy, and the like; upon which Account there are more mad People in this, than in all the other Parts of *Italy*; nay, what in other Countries is but a light Melancholy, ariſes here to a great Height; for Women in a *Chloroſis* do ſuffer almoſt the ſame Symptoms as Perſons poiſoned by the *Tarantula* do, and are cured the ſame Way; and in like manner the Venom of the *Scorpion* does here, in Effects and Cure, agree very much with that of this *Spider*.

From

From all this Hiſtory it ſufficiently appears, that thoſe that are bitten by a *Tarantula*, do thereupon become *Delirious*; and that, in order to account for their ſurprizing Symptoms, the Nature of a *Delirium*, from which many of them proceed, ought to be underſtood.

Such is the Conſtitution of the *Humane Oeconomy*, that as upon the Impreſſion of outward *Objects* made upon the *Organs*, and by the Fluid of the Nerves conveyed to the *common Senſory*, different *Species* are excited there, and repreſented to the Mind; ſo likewiſe upon this Repreſentation, at the Command and Pleaſure of the Soul, Part of the ſame Fluid is determin'd into the Muſcles, and mixing with the arterial Blood there, performs all the Variety of voluntary Motions and Actions.

This Order has been always ſo conſtant in us, that at length, by a Kind of natural Habitude, without the Intervention of the reaſoning Faculty, Repreſentations made to the Mind do immediately and neceſſarily produce ſuitable Motions in the bodily Organs. When therefore theſe Repreſentations are irregular, the Actions conſequent to them muſt neceſſarily be ſo too.

This being premis'd, it may perhaps be probably ſaid, that a *Delirium* is the Repreſentation and various Compoſition of ſeveral *Species* to the Mind, without any Order or Coherence; together, at leaſt moſt commonly, with irregular, or, as it were, undeſigned Motions of the Body; that is, ſuch a wandring and irregular Motion of the nervous Fluid, whereby ſeveral Objects are repreſented to the Mind, and upon this Repreſentation divers Operations performed by the Body, though thoſe Objects are not impreſs'd upon the Organs, nor thoſe Operations or Motions deliberately commanded by the Soul.

The Mind indeed is the firſt Principle of all muſcular Motion; but in ſuch Caſes as theſe, its Promptitude to Action or Habit being ſo great, it is in a Manner ſurpriz'd, and cannot recover it ſelf, after the Spirits are with violent Force determined purſuant to the Repreſentation of the *Species*. For as, in the former State of Things, a Man is ſaid to act rationally; ſo this latter Caſe is called a *Perturbation of Mind*, that is, a *Delirium*; tho' it is very manifeſt, that in Reality the Defect is not in the *rational*, but *corporeal* Part; ſuch *Species* being really preſented to the Mind, upon which, by the Order of our Conſtitution, ſuch Motions ought to follow in the Body.

Thus, for Inſtance, if the Liquor of the Nerves is, without the Preſence of any Thing hurtful, put into a Motion like unto that which a painful Impreſſion makes in it, the ſame bodily Actions muſt enſue as proceed from Fear, Anger, or the like Paſſion, determining the Spirits towards the muſcular Parts; and a By-ſtander, who ſees no Reaſon for ſuch a Repreſentation made to the Mind, will preſently conclude that the Perſon thus acting acts without or beſides his Reaſon, that is, is *Delirious*; eſpecially if the Hurry and Confuſion of the Spirits be ſuch, that not only one, but ſeveral different *Species* be at the ſame Time preſented to the Mind; for a Man in this Caſe may act the Part of one joyful, angry, timorous, or the like, without any appearing Reaſon, and all this almoſt in the ſame Moment of Time.

In one Word, *Deliria* are the *Dreams* of thoſe who are awake; and as theſe in us ſleeping are infinitely various, and wonderfully compounded, and all from the ſame common *Cauſe*, diverſely preſſing the Orifices of the Nerves, and thus making different *Repercuſſions* of their Fluid; and as we all know that this Confuſion making the Repreſentation of ſeveral *Species* to the Mind, there do hereupon follow, tho' the Body ſeem now at Reſt and in perfect Repoſe, ſuch Motions in the Organs as are uſually the Effect of the arbitrary Determination of the Spirits thither; ſo we are now to inquire what Alteration of the Body, made by this Venom, can be the Occaſion of this Diſorder and Tumult in the nervous Fluid, which excites in the Party infected ſuch ſurprizing, and almoſt contradictory, Repreſentations.

Moſt of the Symptoms of thoſe who are bitten by the *Tarantula* are at the firſt, that is, before they riſe to a *Delirium*, plainly the ſame with thoſe which the Bite of a Viper induces; without Doubt therefore, as we have before obſerved of the common Spider, that it pierces the Fleſh with its hooked *Forceps*, and at the ſame Time inſtils from the *Proboſcis* in the Mouth a liquid Venom into

the Wound; ſo the like Claws in this, do ſerve to make Way for an active and penetrating Juice emitted from the ſame Part.

Of the Nature of which we may probably conjecture, that it is, when mixed with the Blood, being exalted by the Heat of the Climate, of ſo great Force and Energy, that it immediately raiſes an extraordinary Fermentation in the whole arterial Fluid, by which its Texture and *Craſis* is very conſiderably altered; the Conſequent of which Alteration, when the Ebullition is over, muſt neceſſarily be a Change in the *Cohæſion* of its Parts, by which the *Globules*, which did before with equal Force preſs each other, have now a very differing and irregular *Niſus* or Action, ſo that ſome of 'em do ſo firmly cohere together, as to compoſe *Moleculæ*, or ſmall Cluſters; upon which Account there being now a greater Number of *Globules* contained in the ſame Space than before, and beſides, the *Impulſe* of many of theſe, when united together, differing acccording to the Conditions of their *Cohæſion*, as to Magnitude, Figure, *&c.* not only will the *Impetus*, with which this Fluid is drove towards the Parts, be at ſome Strokes at leaſt greater than ordinary; but the Preſſure upon the Blood Veſſels muſt be very unequal and irregular; and this more eſpecially will be felt in them which are moſt eaſily diſtended; ſuch are thoſe of the Brain, *&c.* And hereupon the Fluid of the Nerves muſt neceſſarily be put into various *undulatory* Motions, ſome of which will be like unto thoſe which different *Objects* acting upon the Organs or Paſſions of the Mind, do naturally excite in it, whereupon ſuch Actions muſt follow in the Body, as are uſually the Conſequents of the ſeveral *Species* of Sadneſs, Joy, Deſpair, or the like Determinations of the Thoughts; and we ſhall readily pronounce one in this Condition, *Sad*, *Joyful*, *Timorous*, *&c.* and all without any apparent Reaſon or Cauſe; that is, in one Word, we ſhall ſay he is *Delirious*.

This is in ſome Degree a *Coagulation* of the Blood, which will the more certainly, when attended with an extraordinary Heat, as in the preſent Caſe, produce ſuch like Effects as theſe, becauſe the *Spirits* ſeparated from the Blood thus inflamed, and compounded of hard, fix'd and dry Particles, muſt unavoidably ſhare in this Alteration; that is, whereas their Fluid conſiſts of two Parts, one more active and volatile, the other more viſcid and glutinous, which is a Kind of Vehicle to the former; their active Part will bear too great a Proportion to the viſcid, and thus they muſt neceſſarily be of more than ordinary Volatility and Force, and will therefore, upon the leaſt Occaſion imaginable, be irregularly determined to every Part; and hereupon will follow Tremblings of the Body, Anger or Fear upon a light or no Cauſe, extream Pleaſure at what is but a trivial Entertainment, as Red or Green Colours, or the like; and on the other Hand, wonderful Sadneſs at any Thing not agreeable to the Eyes, as Dark and Black Things; nay, ridiculous Laughter, obſcene Talk and Actions, and ſuch like Symptoms; becauſe in this Conſtitution of the nervous Fluid, the moſt light Occaſion will make as real a *Reflux* and *Undulation* of it to the Brain; that is, will preſent as lively and vivid *Species* there, as the ſtrongeſt Cauſe and Impreſſion can produce in its natural State and Condition; nay, in ſuch a Confuſion, the Spirits cannot but ſometimes, without any manifeſt Cauſe at all, be hurried towards thoſe Organs, to which at other Times they have been moſt frequently determined; and every one knows which they are in hot Countries and Conſtitutions.

We muſt however here remember what in the former Eſſay we mentioned, of the Fluid of the Nerves being immediately altered by the venemous Juice.

It will perhaps make this Theory more than probable, to conſider that *Baglivy*, in the Diſſection of a *Rabbet* killed by a *Tarantula*, found the Blood Veſſels of the Brain very turgid, and the Subſtance of the Brain it ſelf, that is, the Beginning of the Nerves lightly inflamed, and with livid Spots here and there, the *Lungs* and other *Viſcera* diſtended, with concrete glotted Blood, and large Grumes of Blood with *Polypous* Branches in the Heart, a large Quantity of extravaſated *Serum* upon the Brain, which is (as he takes Notice) moſtly obſerved in thoſe Subjects which died by a Coagulation of the Blood.

Neither is it amiſs to remark, that in *Chloroſis* there is nothing preternatural be-

an *Infarctus* of the Arteries, and hence a retarded *Circulation*, from an Evacuation ſuppreſs'd, and in this Country too much Heat; that is, a Beginning *Coagulation*, together with an inflammatory Diſpoſition.

In ſhort, *Bellini* has at large demonſtrated, how *Deliria*, as well *Melancholic* as *Manaical*, do proceed from a State of the Blood and Spirits not unlike to that I have here deſcribed.

But no leſs a Confirmation of theſe Notions may we have from the *Cure*; as to which it is obſervable, that the *Tarantati* have no Inclination to *dance* before they hear the Muſick; for being ask'd to do it, they anſwer, It is impoſſible, they have no Strength.

As for the Reaſon therefore of their ſtarting up at the firſt Noiſe of the Inſtrument, we muſt reflect upon what we have juſt now been ſaying concerning the Cauſe of the Motions of the Body in a *Delirium*; and conſider withal, that muſcular Motion is no other than a Contraction of the Fibres from the arterial Fluid, making an Effervescence with the nervous Juice, which, by the light Vibration and Tremor of the Nerve, is derived into the Muſcle.

And thus we have a twofold Effect and Operation of Muſick, that is, both upon the Mind and Body. For a briſk Harmony excites lively *Species* of *Joy* and *Gladneſs*, which are always accompanied with a more frequent and ſtronger Pulſe, or an increaſed Influx of the Liquor of the Nerves into the Muſcles, upon which ſuitable Actions muſt immediately follow; and if we remember what we before hinted, that People in this Country are ſprightly and ready to Exerciſe, and that in ſuch a State of the Fluids as we have deſcrib'd, a ſlight Occaſion preſents as ſtrong *Species*, as a greater can at another Time; the Influence of Muſick on the *Mind* will appear to be ſo much the more powerful and certain.

As for the *Body*, ſince it is ſufficient for the Purpoſe of putting the Muſcles into Action, to cauſe thoſe *Tremors* of the Nerves by which their Fluid is alternately dropped into the moving Fibres; it is all one whether this be done by the Determination of the Will, or the outward *Impulſions* of an elaſtick Fluid; ſuch is the Air, and that Sounds are the *Vibrations* of it, is beyond Diſpute.

Theſe therefore, rightly modulated, may ſhake the Nerves as really as the *Imperium Voluntatis* can do; and conſequently produce the like Effects.

That this is ſo, beſides what we ſhall add anon, we may be convinced by a Story which Mr. *Boyle* relates out of *Scaliger*, of a Knight of *Gaſcony* whom the Sound of a *Bagpipe* would unavoidably force to make Water; for this Secretion we know is regularly the Effect of an arbitrary Contraction of the Muſcle of the Bladder.

The obſtinate continuing of the *Tarantati* in this Exerciſe, is doubtleſs in a great Meaſure owing to the ſtrong Opinion they have of receiving Advantage from it, being incouraged by the By-ſtanders, and having always believed, and been told, that it was the only Cure in theſe Caſes.

The *Benefit* from Muſick is not only their dancing to it, and ſo evacuating by *Sweat* a great Part of the inflammatory Fluid; but beſides this, the repeated Percuſſions of the Air hereby made, by immediate Contact ſhaking the contractile Fibres of the Membranes of the Body, eſpecially thoſe of the Ear, which being continuous to the Brain, do communicate their Tremblings to its Membranes and Veſſels; by theſe continued Succuſſions and Vibrations, the *Cohæſion* of the Parts of the Blood is perfectly broken, and its *Coagulation* prevented; ſo that the Heat being removed by Sweating, and the Coagulation by the Contraction of the muſcular *Fibrillæ*, the wounded Perſon is reſtor'd to his former Condition.

If any one doubts of this Force of the *Air*, let him conſider that it is in *Mechanicks* demonſtrated, that the ſmalleſt *Percuſſion* of the ſmalleſt Body, can overcome the Reſiſtance of any great Weight which is in Reſt; and that the languid Tremor of the Air, which is made by the Sound of a Drum or Trumpet, may ſhake the vaſteſt and ſtrongeſt Edifices.

But beſides all this, we muſt allow a great deal to the *determinate Force*, and particular *Modulation*, of theſe trembling Percuſſions; for contractile Bodies may be acted upon by one certain Degree of Motion in the ambient Fluid, tho' a greater Degree of it differently

qualified may produce nothing at all of the like Effect; this is not only very apparent in the common Experiment of Two String'd Musical Instruments tuned both to the same Heighth, the Strings of the one being struck upon, those of the other will sound, and yet a much greater Motion of the Air may not cause any sensible Vibration at all in the same Chords; but also by the *Trick* which many have of finding the Tone or Note peculiarly belonging to any *Wine Glass*, and by accommodating their *Voice* exactly to that Tone, and yet making it loud and lasting, they will make the Vessel, tho' not touch'd, first to tremble, and then burst; which it will not do if their Voice be but a little either too low or too high.

This last Consideration makes it no very difficult Matter to conceive the Reason, why different Persons, infected with this Venom, do require oftentimes a different Sort of Musick in order to their Cure, in as much as their Nerves and *distractile* Membranes have differing *Tensions*, and consequently are not in like Manner to be acted upon by the same *Vibrations*.

Nor are we to wonder at the Oddness of this Method and Practice; for *Musick*, although it be now-a-days applied to quite different Purposes, was anciently made great Use of for the removing of many, and those too some of the most difficult and obstinate Diseases.

For this we have a Famous Testimony in *Galen* himself, who tells us, That *Æsculapius used to recover those in whom violent Motions of the Mind had induced a hot Temperament of Body, by Melody and Songs*. *Pindar* mentions the same Thing, and indeed from hence not only the Notion, but the very Name of *Charming* seems to have taken its Origine. *Athenæus* relates, that *Theophrastus* in his Book of *Enthusiasm* says, *Ischiadic Pains are cured by the Phrygian Harmony*. This Sort of Musick was upon a *Pipe*, and the most vehement and brisk of all the Ancients knew; so that indeed it was said to raise those who heard it to downright Fury and Madness: And such we have observed to be required to the Venom of the *Tarantula*.

But what is besides in this last Authority very observable to our Purpose, is the Manner of using this Remedy, and that was by *Playing upon the Part affected*, which confirms what we have just now advanced concerning the Effect of the *Percussion* of the Air upon the contractile Fibres of the *Brain*; for *Piping upon* any Member of the Body, cannot be suppos'd to do Service any other Way, than by such Succussions and modulated Vibrations as we before mentioned. And this indeed *Cælius Aurelianus* agrees to, who calls this Practice, *Decantare Loca dolentia*; and says, that the *Pain is mitigated and discuss'd by the Tremblings and Palpitations of the Part*.

Aulus Gellius not only relates this same Cure of *Ischiadic* Ails as a Thing notorious enough, but adds besides out of *Theophrastus*, that *the Musick of a Pipe rightly managed heal'd the Bites of Vipers*.

And not only does *Apollonius* mention the Cure of Distractions of the Mind, Epilepsies, and several other Distempers, this same Way; but *Democritus*, in his Treatise of Plagues, taught, that *the Musick of Pipes was the Medicine for most Diseases*; which *Thales* of *Crete* confirmed by his Practice, when sent for by the *Lacedæmonians* to remove from them the Pestilence, he did it by the Help of Musick.

All which Instances do evince this Remedy to have been very ancient in many Cases; and indeed, as *Cælius Aurelianus* takes Notice that the first Use of it was ascrib'd to *Pythagoras* himself; so he having settled and founded his Sect in those very Parts of *Italy* which are the Country of the *Tarantula*, going then under the Name of *Græcia Magna*, now *Calabria*; it is not, I think, at all improbable that he may have been the Author and Inventor of this Practice there, which has continued ever since: Especially since *Jamblichus* affirms, not only that he made Use of Musick in Physick, but particularly that he found out and contrived some Harmonies to ease the Passions of the Mind, and others for the *Cure of Bites*. But of Musick enough.

To conclude with this Poison, we may take Notice that, as to the *Return* of the Symptomes the next Year, that is owing to the same excessive Heat in those Months acting again upon the small Remains of the venemous *Ferment*; thus *Bartholin* relates a Story of a Melancholy Physician at *Venice* who

who ſuffer'd the Attacks of his Diſeaſe only during the Dog Days, which yearly ended and return'd with them: A convincing Proof how great a Share Heat has in all theſe Caſes.

Of the Mad Dog.

MORE difficult and terrifying are the Symptoms from the Bite of a *Mad Dog*, whoſe Venom has this alſo ſurprizing in it, that the bad Effects do not appear oftentimes till the Cauſe of them is forgot; for the Wound is as eaſily cured as a common Bite is: But nevertheleſs, a conſiderable Time after, a melancholy Tragedy ſucceeds, ſometimes ſooner, ſometimes later; for there are Inſtances of its being deferred to two, ſix Months; nay, a Year, and longer, tho' the Attack is generally within 40 Days after the Wound. About that Time, the Patient complains of running Pains all over his Body, eſpecially near the Part wonnded, like unto thoſe in a Rheumatiſm, grows penſive and ſad, prone to Anger upon little or no Occaſion, with an intermitting Pulſe, Tremblings and Contractions of the Nerves, with a great inward Heat and Thirſt; and yet in a few Days (when the Diſeaſe is come to its Height) a Dread and Fear of Water, and any Liquor whatſoever, ſo that at the very Sight of it he falls into diſmal Convulſions and Agonies, and cannot drink the leaſt Drop; and this *Hydrophobia* or *Aquæ Timor* has been always accounted the ſureſt Sign and Mark of this Poiſon, as diſtinguiſhing it from all others.

The Ancients have at large deſcribed theſe Symptoms, as *Galen*, *Dioſcorides*, *Aetius*, *Ægineta*; but moſt particularly of all, *Cælius Aurelianus*; and later Writers have given us ſeveral Inſtances of the *Hydrophobia*. Two Hiſtories of it publiſh'd, the one by Doctor *Liſter*, the other by Dr. *Howman*, I ſhall more eſpecially take Notice of, and refer to, as containing the moſt exact and large Account of any I have met with: He that deſires more, may conſult the ſeveral Authors cited by that diligent Obſerver *Stalpart van der Wiel*.

That this Diſeaſe is accompanied with a *Delirium*, is almoſt the common Opinion both of Ancients and Moderns. *Democrates* call'd it the barking Phrenzy; but Dr. *Liſter* agrees in this Point with *Petrus Salius Diverſus*, and will not allow a *Delirium* to be the neceſſary Conſequent of this Venom; and yet at the ſame Time he tells us, that his Patient barked like a Dog, and bit at the By-ſtanders; that he threw into his Mouth what was given him more haſtily and ſuddenly than it is natural or cuſtomary for Men to do.

From ſuch Actions as theſe, together with thoſe mentioned before in relating the Symptoms, it is obvious enough to conclude, that Perſons thus affected are in a proper Senſe *Delirious*; though at the ſame Time I do think, that the *Hydrophobia* it ſelf (whatever is commonly believed) does not at all proceed from this *Delirium*, as will by and by appear.

I know indeed, that the main and plauſible *Objection* againſt a *Delirium* is this, That the Patient himſelf does reaſon againſt his Timorouſneſs, though he cannot overcome it, forewarns the Standers-by of his outragious Fits, deſires them to take care of themſelves, and the like; which, from what I have already ſaid concerning a *Delirium*, appears to be very conſiſtent with it; nay, convinces that there is the greateſt Degree of it in this Caſe, inaſmuch as that it is not a Diſtemper of the Mind, but of the Body. And to this Purpoſe I remember to have ſeen my ſelf an Inſtance of one in a Fever, who foretold ſome Time before any Signs of a *Delirium* were diſcover'd, how raving and unruly he ſhould be, and made good his *Prognoſtick* to that Degree, that it was very hard Work to tame and maſter him; though (as he told me afterwards) he reaſon'd as much as he could againſt that groundleſs Jealouſy of his Friends deſigning to murder him, which put him upon his mad Actions, but was not able to conquer the prevailing *Species* of Fear and Anger.

This *Delirium* therefore, as *Cælius Aurelianus* ſays, *proceeds entirely from an Indiſpoſition of the Body*, which is without all doubt owing to the Alteration made in the Blood by the *Saliva* of the *Mad Dog*, inſtill'd into the Wound inflicted by the Bite.

That we may rightly underſtand this, we muſt take Notice, that the *Rabies* or Madneſs in a Dog is the Effect of a violent Fever;

ver; and therefore it is moſt common in exceſſive hot Weather, though ſometimes intenſe Cold may be the Cauſe of it: That no Dog in this Caſe ever ſweats; from whence it follows, that when his Blood is in a Ferment, it cannot, as in other Creatures, diſcharge it ſelf upon the Surface of the Body, and therefore muſt of Neceſſity throw out a great many *ſaline* and active Particles upon thoſe Parts where there is the moſt conſtant and eaſy Secretion; and ſuch, next to the *Miliary* in the Skin in us, are the *Salival* Glands. For this Reaſon much more Spittle is ſeparated in a Dog when mad, than at any other Time, and that very frothy, or impregnated with hot ſubtile Parts.

Now as we every Day obſerve, that what is thrown out from Liquors in a Ferment, is capable of inducing the like Motion in another Liquor of the ſame Kind, when duly mix'd with it; ſo we may very well ſuppoſe in the preſent Caſe, that the *Saliva*, which is it ſelf one of the moſt fermentative Juices in Nature, being turgid with fiery ſaline Particles thrown into it out of the boiling Blood, when it comes (by Means of a Wound) to be incorporated with the Arterial Fluid of any one, does by Degrees raiſe a preternatural Effervescence in it; the Effects of which will neceſſarily be moſt felt in thoſe Parts which (being tender) are the leaſt able to reſiſt the Diſtention of the Blood-Veſſels; ſuch are the Stomach, and eſpecially the Brain: And hereupon *Deliria*, with *maniacal* and ſuch-like Symptoms, will eaſily enſue.

A Perſon thus affected may be ſaid in a Degree to have put on the *Canine* Nature, (though his Reaſon be all this Time untouch'd and entire) may bite, howl, *&c.* becauſe the *like* violent Agitation of the Blood in him as was in the Dog will preſent like *Species*, and conſequently (ſo far as their different Natures will allow) produce like Actions; juſt as it has been obſerved, that *Sheep* bitten by a Mad Dog have run at the Shepherd like ſo many Dogs to bite him; ſo much can an Alteration of the Blood and Spirits do. And as a timorous Creature may be embolden'd, ſo we oftentimes ſee Perſons couragious enough, by a Change made in the Blood by Evacuations, that is, by Want of Force and Motion in that Fluid, made ſheepiſh Cowards, in Deſpight of their Reaſon, ſo long as that Defect is continued.

But the main Difficulties in this Matter are, the Miſchief diſcovering it ſelf ſo long after the Bite, and the *Hydrophobia*.

As to the former, we are to conſider, that Fermentation being a Change made in the Coheſion of the compounding Parts of a Fluid, it is ſometimes a longer, ſometimes a ſhorter, Time before this Alteration is wrought; which Variety may proceed, either from the different Nature and Conſtitution of the Ferment, or of the Liquor fermented, and a great Number of Circumſtances beſides; ſo that this Venom may be all the while doing its Work, though the Change made by it may not be ſo conſiderable as to be ſenſibly taken Notice of till a long Time after.

Nay, it may ſo happen, that the *Ferment* (being weak) may not raiſe in the Blood any remarkable Agitation at all, till ſome accidental Alteration in the Body unluckily gives it an additional Force; as we before obſerved how much external Heat concurs to heighten the Symptoms from the Bite of the *Tarantula*. And this probably may be the Caſe of thoſe in whom this Malignity has not appear'd till ſix or twelve Months after the Wound.

That we may underſtand the Reaſon of the *Hydrophobia*, it is to be remark'd, that this Dread of Water does not come on till the latter End of the Diſeaſe, three or four Days before Death, that is, not till this preternatural *Fermentation* in the Blood is come to its Height; and as in the Dog, ſo in the Patient, a great Quantity of fermentative Particles is thrown off upon the Glands of the Mouth and Stomach, as appears by his Foaming at the Mouth, *&c.*

As alſo, that this *Fear* is not from a Sight *of*, or any imaginary Appearance *in*, the Water; for if the Veſſel be cloſe ſhut, and the Patient bid to ſuck through a Quill, as ſoon as he has taſted, he falls into Anguiſh and Convulſions, as Dr. *Liſter* obſerved. It is therefore highly probable, if not certain, that this ſurprizing Symptom proceeds from the intolerable *Pain* which any Liquor at this Time taken induces, partly by hurting the inflamed Membranes of the *Fauces* in

Deglutition, partly by fermenting with these active Particles discharged by the Blood upon the *Stomachic* Glands, and thus twitching and irritating the nervous Membranes; the very Memory of which *grievous Sense*, after it is once felt, is so terrible, that the affected Person chuses any Thing rather than to undergo it a second Time.

The Effects of this *Irritation* are manifest in the Convulsions of the Stomach, and frequent *Singultus*, with which the Patient is continually oppress'd. And we all know, by how necessary a Kind of *Mechanism* we do fly from and abhor those Things which have proved disagreeable to the *Animal Oeconomy*, to which nothing is so contrary and repugnant as *Pain*; at the first Approaches of which, Nature starts and recoils, though Reason be arm'd with never so much Courage and Resolution to undergo the Shock.

Nor will any Body wonder how this *Ferment* should cause such *Torment*, who considers how often, even in *Colical* Cases, Persons are downright distracted by excessive Pain, from a Cause not unlike to this we are treating of, that is, from a corrosive Ferment in the Bowels, rarefying the Juices there into *Flatus*, and by this Means irritating and stimulating those tender Membranes into spasmodick and convulsive Motions.

And indeed Dr. *Lister*'s Patient told him, that the very swallowing of his own Spittle put him to such Torture in his Stomach, that Death it self was not so terrible as the inexpressible Agony.

It may serve both to illustrate and confirm this Theory, to take Notice, that not only may (according to these Principles) other Bites besides that of a *Dog* happen to induce the like Symptoms, [thus *Malpighi* relates a Story of a Mother made *Hydrophoba* by the Bite of her *Epileptic* Daughter] but that there are other Cases, without any Bite at all, which are attended with an *Hydrophobia*.

Thus *Schenkius*, *Salmuth*, and others, have observ'd a *Dread of Water*, without any Suspicion of a Bite, from *Malignant Fevers*. Now in *these* there is doubtless a hot putrid *Ferment* in the Blood; and it is no Wonder Part of it be discharged upon the Throat and Stomach, which we do evidently find in these Distempers to be more particularly affected by it, especially towards the latter End, from the *Aphthæ*, *Singultus*, and the like usual Symptoms of a fatal Malignity.

Nay, *Hippocrates* himself seems more than once to have remarked something like this Symptom in Fevers, and to call those who were thus affected Βραχυπότας, or Little Drinkers; for I cannot assent to Dr. *Lister*, (though *Cælius Aurelianus* be on his Side) who thinks that the Βραχυπότας are Ὑδροφόβους from the Bite of a Mad Dog, as well for other Reasons, as because *Plutarch* assures us, that the *Hydrophobia* and *Elephantiasis* were both first taken Notice of in the Time of *Asclepiades* the Physician, who lived in the Days of *Pompey* the Great, many Years later than either *Hippocrates* or *Aristotle*.

Of poisonous Minerals *and* Plants.

ALthough there be a great Variety of internal *Poisons*, as well *Mineral* as *Vegetable*, yet they do all of them seem to agree in their primary Effects, and Manner of Operation; and as the Teeth or Stings of *Venemous* Animals do constantly infuse a Juice into the Wound they make, by which the Mass of Blood is infected, so the Force of *these* is chiefly confined to the Stomach and *Primæ Viæ*; and though it may in some Cases be communicated farther, yet the principal Mischief is done in these Parts.

Deleterious Medicines (says *Dioscorides*) *are many, but the Alterations made by them in the Body common, and but few.*

Of all this Kind, those of a *Mineral* Nature are the most violent and deadly, the greater Gravity and Solidity of their Parts giving to these a Force and Action surpassing the Mischief of *Vegetable* Juices; and therefore whereas noxious Plants do vary their Effects in different Creatures, so as to prove harmless, nay, perhaps beneficial and nutritive to some, (as Hemlock they say is to Goats and Starlings, and Henbane to Hogs, the Strength of the Stomach in these Animals being sufficient to conquer and divide such corrosive Substances, and their Blood perhaps requiring to be recruited by such

warm

warm and active Particles) a Mineral Malignity is not, at least so far as we know, conquerable by any, but becomes universally hurtful and destructive.

We shall here give the first Place to *Mercury Sublimate.*

This is no other than a Mixture of *Quicksilver* with *common Salt.* The Way of preparing it, as 'tis made at *Venice*, from whence great Quantities are sent into other Countries, *Tachenius* has given us in his *Hippocrates Chymicus*; as to which we must observe, that though there be always added a Proportion of *Salt-petre* and *Calcin'd Vitriol* to the other Ingredients, yet these do not enter into the Composition, but only serve to facilitate the Work; as abundantly appears from this Experiment, That Mercury sublim'd with the same Proportion of Nitre and Vitriol without *marine Salt*, neither receives any Increase of its Weight, nor acquires any malignant Quality.

The Effects of this *Poison* (when taken) are, violent griping Pains, with a Distention of the Belly, Vomiting of a slimy frothy Matter, sometimes mix'd with Blood, and Stools of the same, an intolerable Heat and Thirst, with cold Sweats, Tremblings, Convulsions, *&c.* as will appear from the following History.

To a large Dog was given a Drachm of *Mercury Sublimate*, mix'd with a little Bread: Within a Quarter of an Hour he fell into terrible Vomitings, casting up frequently a viscid frothy *Mucus*, every Time more and more bloody, and purged the same downwards; till tired and spent with this hard Service, he lay down quietly as it were to sleep, but died the next Morning.

The *Abdomen* being open'd, a great Quantity of extravasated Blood was found between the Liver and Stomach, and between the Duplicature of the *Omentum* about the Stomach. The Guts as well as the Stomach were distended, and full of a frothy bloody *Mucus:* On the Outside they were of a livid Colour, within all over red, and inflamed down to the very *Rectum.* The fibrous Coat of the Stomach being taken off, between that and the nervous one, grumous Blood was found in several Places: The like was discover'd here and there in the Intestines between the same Coats.

The same *Symptoms* with these, and manifest Signs of a burning Corrosion, follow'd with *Ulcers* in the Bowels, *Baccius* observ'd in a young Man poison'd by *Sublimate*, mix'd with his Meat.

What we are here chiefly to examine is how from Ingredients singly innocent and harmless so mischievous a Compound can result; for as the Case is very plain with respect to *Salt*, so is it likewise now notorious enough, that *Quicksilver* it self, which the Ancients, *Dioscorides*, *Galen*, *Pliny*, *&c.* have unjustly rank'd among Poisons, is in many Diseases (inwardly taken) of very safe and beneficial Use; and that not only when disguised with *Sulphur*, *Sugar*, *&c.* but *crude* without any Correction, or vainly pretended Mortification.

This the *Arabian* Physicians first gave the Hint of, *Avicen* having observ'd, that *They who drink it in a large Quantity receive no Hurt its Weight making a free Passage thro' the Body* This was Encouragement enough for the Practice of giving whole Pounds of it in the *Iliac Passion*, which is oftentimes done with good Success, without any frightful Symptom accompanying the Advantage received from its Ponderosity.

Afterwards it plainly appeared, that the Mineral, tho' not taken in so great a Dose as could immediately force its Way thro' the Intestines, even when it was lodg'd for some Time in this or that Part, was not at all hurtful by any corrosive or malignant Quality: And *Fallopius*, *Brasavolus*, with others of great Note, confirm'd its harmless Efficacy in the Cure of the *Worms*, not only in adult Persons, but even in the more tender Constitutions of Children.

Nor are these the only Cases in which good Service may be had from this weighty Fluid. He that rightly considers the State of the Animal *Oeconomy*, the various Alterations it suffers from the Stagnation of more viscid Juices in the smallest Canals, and how much the Impulse and Force of the Circling Blood, by which Obstructions are to be removed, must be increas'd by carrying along with it such Particles as *Mercurial Globuli*, will perhaps see good Reason to allow, that the prudent and cautious Management of *Quicksilver* may do in some obstinate and dangerous Diseases

which we cannot promiſe our ſelves from any other of our known Medicines whatſoever.

But I am not to inſiſt on this Head; and the Learned *Author* of the *New Theory of Fevers* has already moſt ingeniouſly explained the *Mechaniſm* by which ſuch Effects as theſe are produced in the humane Body. It ſuffices to my preſent Purpoſe, to have proved that pure *Mercury* is not poiſonous or coroſive; and therefore not only have I ſeen two Ounces of it given every Day for One and twenty Days together, without any Inconvenience at all, but found once ſome Quantity of it in the *Perinæum* of a Subject I took from the Gallows for a Diſſection, (whoſe rotten Bones quickly diſcover'd what Diſeaſe it was had required the Uſe of it, and that I ſuppoſe chiefly in external Application by Unction) without any Marks of Corroſion of the Part where it was lodg'd.

Though withal we may upon this Occaſion remark, that the extreme Gravity of this Mineral alone, however ſerviceable it may be in other Reſpects, yet when it happens in ſo great a Quantity to obſtruct the Capillary Ducts, as that the Force of the Circling Fluid is not ſufficient to waſh it away, muſt neceſſarily induce Symptoms troubleſome and bad enough, as *Spaſms*, *Contractions*, *Palſies*, &c. which they do commonly experience, who have either been too often dawbed with *Mercurial Ointments*, or for a long Time employ'd in rubbing the *Quickſilver* upon *Looking-Glaſſes*; for the internal Uſe of it will never produce any ſuch Miſchiefs.

As for *Sublimate* then, moſt certain it is, that the *ſaline* Particles do impart to the *Mercury* this malignant Quality; or, to ſpeak more properly, that the *Salt* receives from the *Mercurial Corpuſcles* ſuch an Increaſe of its Gravity and *Momentum*, as renders its cutting Corroſion more effectual and penetrating; for the Manner after which this Matter is done is plainly this:

The *Globules* of the *Mercury*, though ſo minutely divided by the Action of the Fire, as to riſe in the Form of a *Fume*, yet are ſtill ſolid and ponderous Bodies: 'Tis all one to the preſent Purpoſe, whether we ſuppoſe them perfectly *Spherical*, or (with the Learned *Gulielmini*) *Spheroidical*; for in both Caſes, by reaſon of their extreme Parvity, being perhaps ſimple and elementary Bodies, they will eaſily be lodg'd in the Pores and Interſtices of the *ſaline Cryſtals*; which being compos'd of the *Atoms* of *Salt*, variouſly by *Sublimation* combined and united, are a Kind of cutting *Lamellæ* or Blades; the Force of which could never have been very penetrating, upon the Account of their Lightneſs and eaſy Diſſolution, if the *Mercury*, without blunting their Edge, or breaking their Figure, did not lend them an additional Weight, and thus at the ſame Time ſtrengthen their Action, and prevent their quick Solution by the Juices of the Stomach; which cannot now disjoin their compounding Parts, becauſe the Vacuities into which they ſhould, in order to do this, inſinuate themſelves, are already poſſeſs'd and taken up by the *Mercurial Globules*.

In ſhort, theſe *Cryſtals*, which are to be conſider'd as ſo many ſharp Knives or Daggers wounding and ſtabbing the tender Coats of the Stomach, and thus cauſing exceſſive Pains, with an Abraſion of their natural *Mucus*, and (upon the conſtant Senſe of Irritation) continual Vomitings, *&c.* muſt of Neceſſity, ſticking here and there in the Capillary Veſſels, ſtop the Paſſage of the Blood in ſeveral Places, whereupon it ſtagnates, and there follow little Inflammations, which growing higher and higher, terminate quickly in perfect Ulcers and Gangrenes; and theſe, though ſingly very ſmall, yet many in Number, do all together make up one continued and incurable Mortification.

This being the Nature of *Sublimed Mercury*, it may not be amiſs to enquire, how it comes to paſs, that this ſame Compound reſublim'd with *live Mercury* in the Proportion of four Parts to three, (for the *Sublimate* will not take up an equal Quantity) eſpecially if the Work be repeated three or four times, loſes its Corroſiveneſs to that Degree, as to become not only a ſafe, but in many Caſes a noble, *Medicine*; for I do not ſee that any of the Chymical Writers have hit upon the true Solution of this *Phænomenon*.

Here then is to be conſider'd, That the Action of the *ſaline Cryſtals* depending upon their Solidity and Largeneſs, theſe

muſt neceſſarily, by every ſubſequent Sublimation, be broken into ſmaller and ſmaller Parts; the *Mercurial Globules* (for the Reaſons given by the *Author* of the fore-mentioned *Theory of Fevers*) ariſing more quickly and eaſily than the *Salts*, quit the Interſtices in which they were lodg'd, and the *Cryſtalline* Blades are divided every time more and more by the Force of the Fire, whereupon a new Combination of Parts ſucceeds; and although there be a greater Proportion of the *Mineral* to the *Salts* than before, which makes *Dulcified Mercury* ſpecifically heavier than the *Corroſive*, yet the broken Pieces of the *Cryſtals* uniting into little Maſſes of differing Figures from their former Make, thoſe cutting *Points*, which were before ſo ſharp, are now either quite loſt, or at leaſt, by reaſon of their Bluntneſs, cannot make Wounds deep enough to be equally miſchievous and deadly; and therefore do only vellicate and twitch the ſenſible Membranes of the Stomach to that Degree, as excites them to an Excretion of their Contents and glandular Juices, upwards or downwards, according as the Force of Irritation is greater or leſs.

Thus a violent *Poiſon* is mitigated into a *Vomit* or *Purge*; nay, it may eaſily happen, (eſpecially in robuſt Conſtitutions, and if the Bowels be at the ſame Time by any Means defended againſt the ſtimulating Power of the Medicine) that this Twitching may be ſo ſlight, as to be almoſt inſenſible, and hardly troubleſome; and then the *Mercurial Globules*, being freed indeed from moſt of the *ſaline Parts* in their Paſſage through the *Primæ Viæ*, but ſtill having a Mixture of ſome few of them, are quickly convey'd into the Blood, where, by their Motion and Weight, they muſt neceſſarily diſſolve the preternatural Coheſions of all the Liquors, particularly of thoſe which circulate in the ſmalleſt Canals, and are moſt viſcid and tenacious, making them more fluxile and thin, or of more eaſy Secretion; whereupon all the Glands of the Body are as it were ſet to work, and ſcoured of their Contents; but the *Salival* ones eſpecially, being many in Number, very large and wide, and the Juice they ſeparate of a tough and ropy Subſtance, ſo that a conſiderable Quantity of it is accumulated before it is forced out at the Orifices of the Ducts, theſe Effects will be moſt remarkable in *them*, and a *Salivation* or Spitting muſt continue ſo long, till the active Mineral Particles are through theſe and the other Paſſages diſcharged out of the Body.

As the Difference between *Mercury Corroſive* and *Dulcified* lies in a greater and leſſer Degree of Operation and Force, ſo this ſame Conſideration diſtinguiſhes the ſeveral *Preparations* of this Mineral from each other; which, though very many, yet do all vary their Effects in the Body, only according as the *Mercurial Globules* are differently combined with *Salts*, and the *Points* of *theſe* more or leſs broken by the Action of the Fire, in the burning of Spirits upon them, and ſuch-like Managements: And therefore however dignified with the great Names of *Arcana*, *Panaceæ*, *Princes Powders*, &c. they do not afford us any Thing ſingular and extraordinary, beyond what we may with equal Advantage promiſe our ſelves from ſome or other of the moſt common and uſual *Proceſſes*.

We may alſo fairly conclude from this Reaſoning, that the ſafeſt Way of raiſing a *Salivation* is by *internal* Medicines; ſince whatever Miſchiefs can be apprehended from *theſe*, may in a greater Degree follow from the *external* Uſe of *Mercury*; not only becauſe, as we have already hinted, the Mineral *Globules*, being intimately combined with Salts in the ſeveral Preparations given inwardly, will (by the Irritation of theſe) be eaſily and fully thrown out at the Organs of Secretions, till the Blood is quite diſcharged of its Load; whereas, in all the Dawbings with Mercurial Ointments, we can never be certain that none of the heavy Particles are left lodg'd in the *Interſtices* of the *Fibres* or *Cells* of the *Bones*; but alſo, inaſmuch as (by computing the Portion of *Mercury* in all the Doſes neceſſary to promote a Spitting and the Weight of the ſame Mineral uſually applied when this is done by Unction) it will appear, that the Quantity in the latter Caſe vaſtly exceeds that in the former, and conſequently that the Inconveniencies to be feared will be in the ſame Proportion.

Therefore this external Management of *Mercury* is only to be allow'd of, where either the Caſe will bear the Violence of ſuch

Method, or outward *Ulcers* and *Tumours* require a particular Cure by *Liniments*, &c.

Nor is it improper to remark, that we do hereby ſee how the Uſe of this Mineral comes to produce that Effect ſo often complain'd of, (though not always with Reaſon) of making the Bones foul or carious; for if the *Laminæ* or *Fibres* of theſe are already ſo much broken and ſpoiled by a Diſeaſe, as that the Circulation of the Fluids through them can't be maintain'd, they muſt neceſſarily be corrupted more by the Weight of the *Mercurial Globules*; though here alſo it is plain, that the *outward* Uſe of this Remedy will be more to be blamed than the *inward*.

And indeed, as the earlieſt Uſe of *Mercury* was in *Unguents* and *Emplaſters*, ſo moſt of the Prejudices and Outcries againſt it are owing to Effects produced this Way: For the firſt Attempts of the Cure of *Venereal Maladies* by this Remedy were learn'd from the *Arabians*, who (having recommended *Mercurial* Ointments in the *Lepra* or *Scabies*) gave a Handle to the *Italian* Phyſicians to try their Efficacy in removing the Foulneſs of the Skin from a new and terrible Contagion: Neither were they ſparing of their Liniments, which they continued to rub in for 12, 15, nay, ſometimes for above 30 Days together; ſo that it is no Wonder if they often met with very untoward Symptoms from ſo ſevere a Treatment, and if (as ſome of them do affirm) they now and then found *Mercury* in the rotten Bones of their Patients, who had (it may be) ſuffer'd too much both from their Diſeaſe and their Phyſician.

Thus much of *Mercury*. Let us in the next Place examine *Arſenick*, about the Nature and Compoſition of which Authors are very much puzzled.

This in ſhort is either *Native* or *Factitious*, and each of three Sorts, *Yellow*, *Red*, and *White*. The *Native Yellow* is what the *Latins* call'd *Auripigmentum*; and this *Olaus Wormius* makes threefold. The *Red* is the *Sandaracha* of the *Greeks*. The *White* was not known to the Ancients; and indeed *Theophraſtus* ſeems only to have known the *Red*; but *Dioſcorides* deſcribes both *Red* and *Yellow*. *Nicander* had no Knowledge of either; the only Mineral Poiſons he mentions are *Litharge* and *Ceruſs*.

Orpiment and *Sandaracha* differ only by their greater or leſſer Concoction in the Earth; and therefore from *Orpiment* boiled in a cloſe Pot five Hours in a Furnace Fire, is made the *Factitious Sandaracha* as perfect as the *Natural*.

The *Factitious Yellow* is made from the Cruſts of the *Natural Orpiment*.

The *Native White* is more rare, but found plentifully in ſome Silver Mines in *Germany*.

But the *White Factitious* is of the moſt common Uſe of all; and it is, as *Agricola* tells us, no other than *Orpiment* again and again ſublimed with an equal Part of *Foſſile Salt*, till it is brought to a Whiteneſs.

Orpiment and *Sandaracha* are moſtly found in Mines of Gold; and all Metallick Writers do agree them to be the beſt Signs of the Richneſs of the Vein. This is Ground ſufficient for the *Chymiſts* to take *Arſenick* for the Subject-Matter of their great Work, as they call it; and they have very fondly accommodated ſome Ænigmatical Lines in the *Sibylline Oracles* to this *Mineral*. Tho' their Interpretation be ſtrain'd, and not fairly made out, (the *Author* of the Verſes, whatever he might mean, being indeed diſcourſing of the Name of the *Divine Power* it ſelf) yet very true it is, that this great Expectation from *Arſenick* is as old at leaſt as *Caligula*, that is, of more ancient Date conſiderably than the far greateſt Part of thoſe ſuppoſitious and ill-contrived Compoſitions which do now bear the Name of *Oracles*; for that covetous Emperor, as *Pliny* relates, order'd a great Quantity of *Orpiment* to be wrought upon, that he might extract *Gold* out of it, and made ſome; but as it uſually happens in ſuch-like Attempts, the Quantity did not anſwer the Expence.

It is more to our Purpoſe to take Notice, that the later *Pretenders* to this *Philoſophy*, by finding their three *Principles*, *Salt*, *Sulphur*, and *Mercury*, in this Body, will lead us into its true Nature and Compoſition.

For whether we take *Orpiment* or *Sandaracha*, either of them will afford a *Regulus* or Mercurial Subſtance more pure than that of *Antimony*. The Manner of extracting it

L'Emery has taught; and to this indeed the Mineral owes its great Ponderosity.

The Inflammability and Smell of *Arsenick* are sufficient Proofs of its abounding *Sulphur*, which may without much Difficulty be separated from it.

That it consists of some *saline Parts*, we are assured by its Solution in common Water; and it is upon the Account of these that it does more happily promote the *Flowing* of Metals than any other *salt Powders* which the Workmen make use of; wherefore some have call'd it a coagulated *Aqua Fortis*.

From all this it appears, that Authors do vainly dispute wherein the noxious Quality of *Arsenick* resides, since the Case here is plainly much the same with that of *Sublimate Corrosive*; and as the Salts there, together with the Mercurial Particles, do compose pungent *Crystals*, so without all doubt the *Regulus* of this Mineral gives a like Force to the *saline Bodies*, which without this Weight could be but of small Effect. The main Difference is, that in *Arsenick* we have an Addition of *Sulphur*, which does not only strengthen the Action of the other Parts, in that as a *Vinculum* it keeps them united together, but (consisting besides of many hot and fiery Corpuscles) promotes the Inflammation of those Wounds which the Crystalline *Spicula* make in the Membranes of the Stomach.

Upon the Score of such a Texture and Make as this, *Arsenick* makes no Ebullition either with *Alcalies* or *Acids*: And *as* the *Regulus* of it, being cleared from most of its Salts, is by much less hurtful than the crude Mineral it self; *so* on the other Hand, the *Factitious White*, in which there is a much greater Proportion of the saline to the metallick Parts, is the most violent of all the Kinds, superior in Force to *Mercury Sublimate*.

The several Histories related by *Wepfer* do put this out of Question; it is sufficient to our Purpose to mention one.

A Dog, having eat some Fat mix'd with *White Arsenick*, died the next Day. The upper Part of the Stomach (when open'd) was red and inflamed, the Coats thinner than ordinary, the Bottom of it was cover'd with a fœtid Slime, and some Pieces of Fat; the thin Guts were so corroded as to be pervious in three Places, two of the Ulcers so large that they would easily admit a *Bean*. The Cavity of the *Abdomen* contain'd a yellowish *Ichor* tinged with Blood.

The Case being thus, one would wonder what should induce Authors to prescribe so corrosive a Mineral to be worn upon the *Pit* of the Stomach as an *Amulet* against the Plague. This Trick we may well believe to be dangerous, when *Lionardo di Capo* tells us of a Child kill'd by a violent Vomiting and Purging, occasioned from a slight Wound made in the Head by a *Comb* wet with Oil in which *Arsenick* had been infused; for the Pores of the Body being open'd by Heat and Exercise, some of the noxious *Effluvia* may easily insinuate themselves into the Part. Accordingly *Crato* observ'd an Ulcer of the Breast caus'd by this Application; *Verzascha*, violent Pains, and fainting Fits; *Diemerbroeck* and Dr. *Hodges*, Death it self.

The Truth of the Matter is, this Practice seems to owe its Origine to a Mistake: Some of the *Arabian* Physicians had commended *Darsini* worn in a Bag for a Preservative in Plague-time. This in their Language signifies *Cinnamon*. But the *Latin* Interpreters retaining the same Word in their Translations, (as was frequently done) one or other afterwards, not understanding its Meaning, and deceived by the Likeness of the Sound, substituted in its Place *De Arsenico*, as if *Darsini* were all one with *Zarnich*. The Authority of the first Author serv'd to propagate the Error: Nor were those wanting who reason'd upon the Matter, and found it agreeable to their Philosophy, that this Mineral should draw to it self and concenter the *Arsenical Effluvia* out of the Air, and thus secure the Body from their Infection, these being (as they imagined) the common Cause of Pestilential Diseases.

Having thus particularly discours'd of the Nature of these two Poisons, I shall not need to insist upon any more out of the *Mineral Kingdom*.

All of *them* bear some Analogy to the former, and are more or less dangerous, according as their *Salts* receive a differing Force from the *metallick* Particles. For this Reason, as we have observ'd that the most virulent may be mitigated by breaking the

Points

Points of the *Saline Chryſtals*; ſo on the other Hand, the moſt innocent Minerals may become corroſive, by combining them with *Salts*, as we ſee in the ſeveral Preparations of *Silver*, *Antimony*, *Iron*, *&c.*

Poiſonous Plants.

TO Proceed therefore to *Vegetables*: The moſt notorious of theſe for Venomous Juices among the Ancients were *Cicuta* and *Aconitum*.

Our *Oenanthe Sicutæ Facie*, *Succo viroſo*, which *Wepfer* has deſcribed by the Name of *Cicuta Aquatica*, and of the diſmal Effects of which in ſome Children, who by Miſtake did eat of it, he has wrote a large Volume, was very probably the *Cicuta* ſo much in Uſe of old, eſpecially at *Athens*, for *Killing*. At leaſt the Violence of this makes it a much fitter Inſtrument of Death than the common *Hemlock*, which is not by far of ſo malignant a Quality.

Tho' we muſt withal allow differing *Climates* very conſiderably to heighten or abate the *Virtues* of *Plants*. And it is not altogether improbable, that the Poiſon with which the *Athenians* took away the Lives of Malefactors, was an inſpiſſated Juice compounded of that of *Cicuta* and other corroſive Herbs.

But be this as it will, the Alterations which *Wepfer* obſerved the Roots of *Oenanthe* to make in the Body, were a violent Pain and Heat in the Stomach, terrible Convulſions, with the Loſs of all the Senſes; Diſtortion of the Eyes, and flowing of Blood out at the Ears; the Mouth ſo faſt ſhut, that no Art could open it; Efforts to vomit, but nothing thrown up; frequent Hickcoughs, with a great Diſtenſion and Swelling, eſpecially at the Pit of the Stomach; and when Death had concluded the Tragedy, a continued Running of green Froth at the Mouth.

Stalpart van der Wiel gives us the like Account of two Perſons kill'd at the *Hague* by the ſame *Roots*.

In a *Dog*, who for Experiment's Sake died of this *Poiſon*, the Stomach when opened was found quite *conſtringed*, and ſhut up at both *Orifices*, its inward Surface red, with livid Spots here and there; the Inteſtines were empty, only the *Rectum* contained a little greeniſh *Mucus*.

Thus it appears, that this Plant conſiſts of hot, acrious and corroſive Parts, which by rarefying the Juices of the Stomach, and wounding its nervous Membrane, are the Cauſe of all thoſe Diſorders which do immediately follow.

For upon the Senſe of a violent *Irritation* and *Pain*, the Fluid of the Nerves is preſently in large Quantities determined to the Part affected; and this, if the *Stimulus* be not over great, will be only to ſuch a Degree as is ſufficient, by contracting the Fibres of the Stomach, and Muſcles of the *Abdomen*, to throw off the Cauſe of the diſagreeable *Senſation*; but the uneaſy *Twitching* being too terrible to be born, the Mind, by a Kind of Surprize, does with *Haſte* and *Fury* as it were command the Spirits thither: Thus the Buſineſs is over-done, and the Action of the Fibres becomes ſo ſtrong, that the Orifices of the Stomach are quite cloſed; ſo that, inſtead of diſcharging the noxious Matter, the *Torment* is made greater, and the whole *Oeconomy* put into Confuſion.

This forcible Contraction of the Muſcles was the Reaſon that one of the Children which *Wepfer* ſaw, made *Urine* in the Midſt of the Agony, to the Height of Five or Six Foot, with a Strength and Violence ſurpriſing to the Spectators.

Nor is it any Wonder, if in theſe *Circumſtances* all Senſe be loſt, Blood guſh out at the *Ears*, *Noſtrils*, *&c.* the Parts being all torn and broke by the Violence of the *Convulſions*; which tho' they began in the Muſcles of the Belly, muſt at laſt prevail in the Members too, till the whole Fabrick is ſhock'd and overturn'd; and ſome of the *corroſive Salts* perhaps getting into the Blood, and by the Rarefaction of it diſtending the Veſſels, the membranous Coats of which being already overſtretched, will the more eaſily give Way, and let out their Fluid.

The Caſe of *Aconitum* is much the ſame; this is our *Napellus* or *Monkshood*, and its Effects do ſo nearly agree with thoſe now related of *Oenanthe*, that I ſhall not need to recite them; the Experiments of *Wepfer* are full and convincing. And indeed, as all the *Hiſtories* which this ſame *Author* has ſo carefully given us of Trials made with ſeveral

Vege-

Vegetable Poiſons, *Solanum*, *Nux Vomica*, *Coculus Indicus*, *&c.* on different Creatures, do put it out of all Doubt, that the common Miſchief of theſe is a Twitching and Inflammation of the Stomach; ſo it appears from hence, that *Virulent Plants*, although they may be diſtinguiſhed even from one another by *particular Virtues*, do however *kill* by a like Operation and Force, which differs chiefly in Degree from that of noxious Minerals.

And therefore in order to know what the *ſpecifick Qualities* of any ſuch *Herbs* are, they muſt be given only in very ſmall *Doſes*; and then perhaps it would appear, that they are not made (as ſome do imagine) to be deleterious and deſtructive, but for very good and beneficial Uſes; as we do particularly experience in the Caſe of *Opium*.

Nor is it at all ſtrange, that the *Symptoms* from a *Vegetable* and from a *Mineral* Virulency ſhould be ſo different, although of the ſame Kind, and only of unequal Force; for the more ſolid Parts of *Minerals*, eroding the Coats of the Stomach, induce a perfect Mortification and Gangrene, and thus do their Work at once; whereas the weaker Salts of *Plants* can make but a ſlighter *Excoriation*, upon the painful Senſe of which thoſe Agonies and Convulſions that follow do rather gradually exhauſt the Strength, and thus the Animal is not kill'd ſo ſpeedily, nor with the ſame *Appearances*.

Upon this Score, tho' Mineral Poiſons do not paſs the *Primæ Viæ*, Vegetable Ones in ſome Caſes poſſibly may; juſt as we find thoſe Medicines which have a great Degree of Irritation preſently to induce a *Vomiting*, whereas the ſame *Twitching* a little weaken'd ſuffers them to paſs into the Inteſtines, and work downwards by Stools.

By this we may perhaps give ſome Gueſs at the Nature of thoſe *Poiſons*, with which they tell us the *Natives* in ſome Parts of *Africa* and *India* are ſo expert at Killing, that they can do it in a longer or ſhorter Time as they pleaſe. Theſe are moſt probably either the *Fruits*, or the inſpiſſated *Juices* of corroſive Plants, which inflaming the Bowels, may cauſe little Ulcers there, whoſe fatal Conſequences, we know, may very well be ſlow and lingering.

This I am the rather induced to believe, becauſe an ingenious *Surgeon*, who lived in *Guinea*, told me, that the *Antidote* by which the *Negroes* would ſometimes cure thoſe who were *poiſoned*, was the *Leaf* of an *Herb* which purged both upwards and downwards. For by this Means the Stomach might be cleared from the adhering corroſive Parts of the Venom. Yet I can hardly think it poſſible at the ſame Time that they ſhould be able, by varying the Compoſition or Quantity of the *Doſe*, to aſcertain the Time in which it ſhall kill, to a Week, Month, *&c.* nor indeed have I ever met with any Perſon who could atteſt this to be Matter of Fact.

Though repeated Trials and Obſervations may help one well practiſed in ſuch Tricks to give notable Conjectures in this Point.

The Ancients indeed pretended much the ſame Thing with their *Aconitum*, of which they ſeem to have made a Kind of Secret and Myſtery; as we learn from *Theophraſtus*, who ſays, *The ordering of this Poiſon was different according as it was deſigned to kill in two, three Months, or a Year.* But this he relates only as a common *Tale* or *Opinion*, and not as a Story to which himſelf gave any Manner of Credit.

It is very plain, that the common *Cure* of all Poiſons of this Kind, muſt be by freeing the Stomach, as ſoon as poſſible, from the corroſive and vellicating Particles, and defending the Membranes from their Acrimony, by ſuch Things as are of a ſmooth, oily and lubricating Subſtance.

Of Venomous Exhalations from the Earth, Poiſonous Airs, and Waters.

BEſides theſe already treated of, there is yet another Way of being *Poiſoned*, and that is, by *Venomous Steams* and *Exhalations*, or *Poiſonous Air* taken into the Body by the Breath.

This is notorious enough, and Authors upon many Occaſions make Mention of it; but when they come to explain the particular Manner how this kills, they moſt commonly reduce it to ſome of the *Poiſons* which pro-

prove deſtructive by being admitted into the Stomach, alledging that malignant Fumes and Airs are therefore fatal, becauſe impregnated with *Arſenical*, *Mercurial*, and the like deleterious Μιάσματα or Particles, they do convey theſe into the Blood; which being of a very corroſive Nature, muſt neceſſarily do Hurt both to the fluid and ſolid Parts.

And indeed that the *Fumes* of theſe ſame Minerals are very pernicious, and Air fill'd with their Atoms very unfit for Reſpiration, is moſt certain; but to argue from hence, that all deadly *Vapours* and malignant *Airs* owe their Miſchief to theſe only, is too fond and ill-grounded a Conceipt; ſince upon a due Enquiry it will appear, that there may be, and are, *Mortiferous Exhalations* from the Earth, infecting the Air, of a Nature ſo different from any of thoſe *Poiſons*, that the very Subſtance from which they ariſe may not be at all hurtful, tho' taken into the Stomach it ſelf.

Venomous Steams and Damps from the Earth, the *Latins* in one Word called *Mephites*.

This, as many other *Tuſcan* Words, comes from a *Syriac* Theme, which ſignifies to blow or breathe.

And in ancient Times ſeveral Places were notorious for them; ſo the *Mephitis* of *Hierapolis* was very famous, of which *Cicero*, *Galen*, but more particulary, and from his own Sight and Knowledge, *Strabo* makes Mention.

Such another was the *Specus Corycius* in *Cilicia*, which upon the account of its ſtinking deadly Air, ſuch as is thought to proceed from the Mouth of *Dragons*, which the Poets give to *Typhon*, was called *Cubile Typhonis*. This *Pompon. Mela* deſcribes, and it is indeed as ancient as *Homer*; for *Arima*, in which he places it, was, as *Euſtathius* ſays, a Mountain of *Cilicia*.

Neither are ſuch *Fumes* as theſe unfrequent now-a-days, and though moſtly taken Notice of in Mines, Pits, and other ſubterraneous Places, yet they are ſometimes met with in the Surface of the Earth too, eſpecially in Countries fruitful of Minerals, or impregnant with imbowelled Fires; ſuch are *Hungary* and *Italy*, which latter (as *Seneca* obſerves) has always been more than any other remarkable for 'em.

I ſhall therefore, having had the Opportunity of making ſome Remarks upon One the moſt famous of all in thoſe Parts, give as good an Account as I can of that, and its Manner of Killing; which tho' I dare not affirm to be univerſally applicable to any *Mephitis* whatſoever, yet ſeems plainly to be the Caſe of moſt of 'em; and where it is not, this ſimple Miſchief will only be found to be complicated with another; and then ſome extraordinary Symptoms or Appearances in the Animals kill'd, will eaſily make a Diſcovery of the additional Venom and Malignity.

This celebrated *Mofeta*, taken Notice of (or at leaſt ſome other here abouts) even in the Time of *Pliny*, is about two Miles diſtant from *Naples*, juſt by the *Lago d'Agnano*, in the Way to *Pozzoli* or *Puteoli*, and is commonly called, *La Grotta de Cani*, becauſe the Experiment of its deadly Nature is frequently made upon *Dogs*; tho' it be as certainly fatal to any other Animal, if it come within the Reach of its Vapour; for *Charles the Eighth* of *France* prov'd it ſo upon an *Aſs*; and two *Slaves* put into it by Order of *D. Pietro di Toledo*, Viceroy of *Naples*, with their Heads held down to the Earth, were both kill'd.

'Tis a ſmall *Grotta* at the Foot of a little Hill, about Eight Foot high, Twelve long, and Six broad: From the Ground ariſes a thin, ſubtle, warm *Fume*, viſible enough to a diſcerning Eye, which does not ſpring up in little Parcels here and there, but is one continued Steam, covering the whole Surface of the Bottom of the Cave, and has this remarkable Difference from common Vapours, that it does not, like Smoak, diſperſe it ſelf into the Air, but quickly after its Riſe falls back again, and returns to the Earth; the Colour of the Sides of the *Grotta* being the Meaſure of its Aſcent; for ſo far it is of a darkiſh Green, but higher, only common Earth, and this is about Ten Inches. And therefore as my ſelf found no Inconvenience by ſtanding in it; ſo no Animal, if its Head be kept above this Mark, is in the leaſt injured: But when (as the Manner is) a Dog, or any other Creature, is forcibly held below

it,

it, or, by reaſon of its Smallneſs, can't hold its Head above it, it preſently, like one ſtunned, loſes all Motion, falls down as dead, or in a Swoon, the Limbs convuls'd and trembling, till at laſt no more Sign of Life appears, than a very weak and almoſt inſenſible Beating of the Heart and Arteries, which, if the Animal be left there a little longer, quickly ceaſes too, and then the Caſe is irrevocable: But if ſnatch'd out, and laid in the open Air, ſoon comes to Life again, and ſooner, if thrown into the adjacent *Lake*.

In this ſhort, but accurate, Hiſtory of the *Grotta de Cani*, I have ſet down thoſe Particulars, which do not only diſtinguiſh *Mephitical* Exhalations from common and innocent Fumes, but alſo give Hints ſufficient, I think, mechanically to determine the Reaſon and Manner of their ſurprizing Effects.

And not to ſpend Time in refuting the Opinions of others, I ſhall only take Notice, that here can be no Suſpicion of any true *Venom*, or real Poiſon; if there was, it were impoſſible that Animals taken out of the *Grotta*, ſhould ſo immediately recover the Effects of it, without any remaining Appearance of Faintneſs and Sickneſs, or ſuch like Symptoms as thoſe ſuffer who have been breathing in an Air impregnated with malignant corroſive *Effluvia*. Beſides that, the Venomous Corpuſcles would certainly, in ſome Degree at leaſt, infect the Air in the upper Part of the Cave, which continues pure, and fit for Reſpiration. Neither indeed, after what Manner ſoever this Poiſon be imagined to act, whether by diſſolving or coagulating the Blood, could its Efficacy be ſo ſudden and momentaneous, without ſome Marks of it in the Creatures kill'd, when opened, which yet do diſcover nothing of this Nature extraordinary, neither in the fluid, nor in the ſolid Parts.

In order therefore to underſtand wherein this deadly Quality conſiſts; I ſay in the firſt Place, that Life, ſo far as it reſpects the Body, is, in one Word, the *Circulation* of the Blood; that is, its Motion in *conical* diſtractile Veſſels from the Heart to the extreme Parts, and its Return to the Heart again by the ſame Canals inverted; for 'tis upon this that all animal Functions, all Senſe and Motion, voluntary and involuntary, do depend; ſo that the Regularity of this Courſe is the Meaſure of Health, or the moſt perfect Life, as its various Irregularities are the Occaſions of Sickneſs and Diſeaſes, or a beginning Death.

Now all the animal Operations and Offices which proceed from this Circulation, are the Effects of ſeveral Secretions of Liquors of very different Natures out of the ſame fluid Maſs; it was therefore abſolutely neceſſary that the Blood, before it be diſtributed to the Organs, ſhould be ſo comminuted and broken, as that no Cohæſion of its Parts ſhould hinder the Separation of theſe *Juices* from it, when it arrives with a determinate Force at the Orifices of the Secretory Veſſels.

This Work is done in its Paſſage through the *Lungs*, by the repeated Compreſſion of the Air in thoſe *Bladders* upon the Arteries with wonderful Contrivance diſpers'd among 'em. Herein lies the Uſe and Neceſſity of *Reſpiration*, and the ſudden Miſchief of ſtopping it, in that the whole Maſs of Blood being to paſs this Way, upon a Check here there preſently enſues a Stagnation, that is a Ceſſation of all animal Functions, or Death; which will be the more ſpeedy, if not only no Air is inſpired, but a Fluid of quite different Nature from it ſucceeds in its Place.

Wherefore it muſt be obſerved, that this good Effect of the Air is performed by its *Elaſticity*; and that no Fluid whatſoever that we know beſides, is *elaſtick*, at leaſt to any conſiderable Degree; that is, has a Faculty of expanding and dilating it ſelf when compreſſed: No, not *Water*, as near as that is thought to approach to Air in this Nature.

And now as to the preſent Caſe, I took Notice before that this *Vapour* is one continued and uninterrupted *Steam*, and that quickly after its Riſe, it falls down again; that is, that it has little or no Mixture of Air with it, or no Elaſticity; and is, on the other Hand, very heavy, when forſaken by the Force of *Heat* that drove it upwards.

So that I make no Queſtion, but that Animals in this Place do, inſtead of Air, inſpire *Mineral Fumes*; that is, a thin watery Vapour, impregnated with ſuch Particles as do, when united together, compoſe ſolid and heavy Maſſes; which is ſo far from helping the Courſe of the Blood through the Lungs, that it rather expels the Air out of the *Veſiculæ*, and ſtraitens the Paſſage of the Blood Veſſels, by its too great Gravity; whereupon the *Bladders* are relaxed and ſubſide, and the Circulation is immediately interrupted. But if the Animal be in Time removed out of this *Steam*, that ſmall Portion of Air which does, after every Exſpiration, remain in the *Veſiculæ*, may be powerful enough to drive out this noxious Fluid; eſpecially if the Head of the Creature be held downwards, that ſo its Gravity may forward its Expulſion; or it be thrown into Water, which by aſſiſting, upon the Account of its Coldneſs, the Contraction of the Fibres, promotes the retarded Circle of the Blood; as we every Day experience in a *Deliquium Animi*, or Swooning Fit.

Tho' if this Stagnation be continued too long, no Art can renew Life, no more than in One perfectly ſtrangled; nor will the *Lake of Agnano* it ſelf be of any Service; which ſhews, that there is no ſingular Virtue in that Water beyond any other; nor is it, as ſome have fondly imagined, a peculiar Antidote for the Poiſon of the *Grotta*.

The bad Effects of ſuch *Fumes* as this will be the more certain, becauſe the inſpired Mineral Particles twitch and irritate the Membranes, which are hereupon contracted to that Degree, as not to be able to recover their Tone, and ſo the Force and Action of the *Lungs* is quite loſt.

It appears from all this not to be at all neceſſary to make any farther Enquiry into the particular Nature of theſe Mineral Particles, ſince they do in this Caſe act chiefly by their *Gravity*, which is common to 'em all. Tho' indeed the *Greeniſh* Colour of the Earth, together with its *Subacid* Taſte, very much (as *L. di Capoa* obſerves) like to that of the *Phlegm* of *Vitriol*, ſeem to declare them, if not altogether, yet principally at leaſt, to be *Vitriolick*.

To conclude this Part of our Diſcourſe; I think it a ſufficient Confirmation of this Reaſoning, that in *Frogs* kill'd in this *Grotta*, the *Bladders* of the Lungs (more viſible otherwiſe and diſtinct in theſe Creatures than in moſt others) were found ſubſided, and quite empty of Air. But if any one deſires a farther Proof, he may, according to theſe Principles, make (as *Lionardo di Capoa* did) an artificial *Mephitis*; for if *Antimony*, *Biſmuth*, or any other ſuch Mineral, be finely powdered, and moiſten'd with *Aqua Fortis*, or *Spirit* of *Nitre*, there will ariſe a great Heat, and a thick dark Smoak, in which, as in the *Grotta de Cani*, Torches are extinguiſh'd, and Animals, though but ſlowly, ſtifled and kill'd. And this Effect will be more ſenſible, and equal to the moſt violent *Mephites*, if the *Antimony* or *Marcaſite* be mix'd with *Bitumen*, and the *Spirit* of *Nitre*, or *Aqua Fortis*, intirely depurated from all its *Phlegm*.

And thus I have ſhewn how Death may enter at the Noſtrils, tho' nothing properly *Venomous* be inſpired. It were perhaps no difficult Matter to make it appear, how a leſſer Degree of this Miſchief may produce Effects, tho' ſeemingly very different from theſe now mentioned, yet in Reality of the ſame pernicious Nature; I mean, how ſuch an Alteration of the common Air as renders it in a Manner *Mephitical*, that is, increaſes its *Gravity*, and leſſens its *Elaſticity*, (which is done by too much Heat, and at the ſame Time too great a Proportion of watery and other groſſer Particles mix'd with it) may be the Cauſe of *Epidemic* Diſeaſes, and, it may be, more eſpecially of thoſe which, by reaſon of their untoward Symptoms, are uſually called *Malignant*.

For it is very remarkable, that *Hippocrates* obſerv'd the Conſtitution of the Air, which preceded *Peſtilential* Fevers, to be great *Heats*, attended with much *Rain* and Southern Winds; and *Galen* takes Notice, that no other than a *moiſt* and *hot* Temperament of the Air brings the *Plague* it ſelf; and that the Duration of this Conſtitution is the Meaſure of the Violence of the Peſtilence. *Lucretius* is of the ſame Mind, for in his admirable Deſcription of the *Plague* of *Athens*,

These *Diseases*, says he, *either come from the Air, or arise from the Earth.*

-------- *Ubi* Putrorem humida *nacta est*
Intempestivis Pluviisq; & Solibus *icta.*

In short, the general *Histories* of *Epidemic* Distempers do almost constantly confirm thus much, and would have done it more, if the vain Notion of *Occult Venoms* had not prepossess'd the Minds of Authors, and made them regardless of the manifest Causes.

And this is notorious enough in those Countries where *Malignant* Diseases are most rife. Thus it is a very common Observation in the *East-Indies*, that during the dry Heats the Season is healthful; but when the Rains fall immediately upon the hot Weather, then *untoward Fevers* begin to threaten.

The same is observ'd in *Africa*; for (as *Joan. Leo* relates) if *Showers* fall there during the sultry *Heats* of *July* and *August*, the *Plague* and pestilential Fevers ensue thereupon, with which whosoever is infected hardly escapes.

And here I might, by reflecting on the Use and Necessity of *Respiration*, and the particular Manner of performing it, (of which I have hinted something already) and considering withal the true Nature of *Fevers*, easily shew how such a Constitution of the Air, as this is, must necessarily produce such Effects; might run over the *Propositions* of *Bellini*; which as they do plainly evince *Malignant* and *Pestilential Fevers* to be owing to a viscid and tenacious *Lentor* or Slime, which at first obstructs the capillary Arteries, and afterwards being dissolved by Heat, ferments with the Blood, and changes it into a Mass unequally fluid and glutinous, and therefore unfit for all the Operations of the animal Oeconomy; so it would be no uneasy Task to prove, that Air at the same Time *hot* and *moist*, being less able to comminute and break the arterial Fluid in the *Lungs* than is necessary, in order to prepare it for Secretions, it is no Wonder, if when the Blood passing through the capillary Vessels arrives at the secretory Organs, the Cohæsion of its Parts not being sufficiently removed, instead of deriving several Juices out of it into the Glands, it leaves its most glutinous and viscid Parts sticking about the Orifices of these Vessels; which tho' they may at first be wash'd away by the repeated Impulses of the succeeding Blood, yet the Cause continuing, and these Strokes growing still weaker and weaker, (from a lesser Quantity of Spirits being separated, and hence a more languid Contraction of the Heart) these Obstructions are increased to that Degree as not to be removed, till by the violent Agitation of a greater Heat, this *slimy Mucus* is thrown into the Blood again, and there, in the Nature of a *Ferment*, so disturbs its *Mixture*, and changes its *Compages*, as to make it a Fluid of quite different Properties, that is, altogether unfit for the same Functions or Offices.

This Effect will be the more certain, because a damp Air upon the Surface of the Body checks insensible Perspiration, so that a great Quantity of this being detained, the Obstructions are still greater in the small Tubes; whereas indeed, upon the Account of a more than ordinary Heat, this Discharge ought now to be in an increased Proportion.

Such a Disposition of the Blood as this the Ancients call'd *Putrid*; and, to speak plainly, it is a beginning Stagnation, with a succeeding Heat and Fermentation.

Nor would it be amiss here to take Notice, how unjustly some Authors, having quitted the Consideration of *plain Causes*, for *Occult Venoms* and *Deleterium quid*, have brought in the Θειον τι (*Something Divine*) of *Hippocrates* to favour their fond *Hypothesis*; tho his best Interpreter, *Galen*, understood by this Expression no such Thing as they mean; but on the other Hand, only the *manifest Constitution of the ambient Air*, such as himself has described in his *Aphorisms*, and which is exactly the same with that we have been discoursing of.

And therefore not only does *Minadous* rightly remark, that in his whole *Epidemics* *Hippocrates* never once mentions any *Venom* or Poison as the Cause of *Malignant* Diseases; but the Divine Old Man himself in another *Treatise* expressly teaches us, that *All Maladies do equally, or one as much as another, proceed from the Gods, there being nothing more*

D

Divine in this than in that, each acknowledging its own Natural and manifeſt Cauſe.

But I willingly wave inſiſting upon theſe Heads, as well as the Hints which might be taken from this Theory, of ſome Uſe perhaps in the Cure of theſe Diſtempers; and leave it to our Phyſicians to judge upon how good Grounds they do, in Caſes of this Nature, under the Notion of *Alexipharmics*, give ſuch Medicines as raiſe a great Heat both in the Stomach and Blood; only praying them to take Care, leſt while they are ingaging the Animal Spirits in War with *Malignities*, they do ſend treacherous *Auxiliaries* to the ſuppoſed weak *Party*; that is, that they either raiſe new Tumults and Diſorders, of worſe Conſequence than the original Miſchief; or at leaſt, by clogging the Wheels, and throwing Duſt upon the Springs, of the fineſt Machine in the Creation, do check and interrupt the Action of Nature, when 'tis imploy'd about the moſt nice and *critical* Work.

Neither can I, tho' an Occaſion be fairly offer'd, by any Means be induced to intermeddle in the Controverſy of thoſe Gentlemen, who, by the Help of Two Words, are made Maſters both of Philoſophy and Phyſick; I mean, the violent Aſſertors of *Acid* and *Alkali*. Theſe ſcanty Principles fall infinitely ſhort of that vaſt Variety there is in the Works of Nature; however, for their Sakes who are as yet advanc'd no farther, I will adviſe the contending Parties, (becauſe little Good is got by Quarrelling) to think of an Union, and if they can find no Remedies but out of theſe two Tribes, to make Uſe of ſuch as Reſult from a prudent Mixture of ſome out of each. If this *Project* does not take, to reſolve however on both Sides, to diſtinguiſh the differing Times of the ſame Diſeaſe, and know, that as, on the one Hand, *Acid* Medicines are oftentimes as certainly hurtful in the latter End, as they do Service in the Beginning of the Fever; ſo, on the other, thoſe which are *Alcalious* muſt neceſſarily, for the ſame Reaſon, do Miſchief in the firſt Periods, for which they are profitable in the laſt Days of the Diſtemper.

By what Mechaniſm this comes to paſs, they will eaſily underſtand, when they have learn'd what Alteration ſuch Things as theſe are do make in the humane Body; nor will it then be a difficult Matter to convince them, that he is equally a fond Slave to an *Hypotheſis*, who becauſe *Acids* are ſometimes of great Service in Fevers, concludes that their Origine is *Alcalious*; as he who, knowing that ſtagnating and fermenting Juices do eaſily turn to *Acidity*, from thence argues that *Alcalies* are the only Cure of this Stagnation and Ferment.

But Dr. *Pitcarne* has abundantly demonſtrated the Weakneſs of theſe Men's Reaſonings, and the Vanity of ſuch immechanical Theories.

And here I would put a Period to this Part of the Diſcourſe, were it not that theſe Diſtempers being ſometimes *Contagious*, and *Contagion* being juſtly reputed a real *Poiſon*, it may be worth the while to examine a little what this is, and wherein it conſiſts; more eſpecially, becauſe ſome may perhaps be apt to think this to be an Argument of an *Occult Venom*'s being the Firſt and Original Cauſe.

We are therefore to take Notice, that when a *Fever* is communicated by Way of *Infection* from one already diſeaſed, this moſt commonly happens in the latter End of the Diſtemper, that is, (as we before diſcourſed concerning the *Hydrophobia*) when the fermenting Blood is throwing off great Quantities of its active fermentative Particles upon the Glands of the moſt conſtant and eaſy Secretion; ſuch are thoſe in the Surface of the Body, and the Mouth and Stomach: By this Means therefore the Liquid of inſenſible Perſpiration, and the Sweat, is impregnated with theſe Μιάσματα, and thus the ambient Air becomes fill'd with them; ſo that not only (as *Bellini* argues) may ſome of theſe *Effluvia* inſinuate themſelves into the Blood of a ſound Perſon thro' the Pores of the outward Skin, but alſo in Inſpiration through the Membrane of the Lungs; for he has in another Place demonſtrated how the Air, or ſomething from it, may this Way come to be mix'd with the arterial Fluid; and thus the like *Ferment* will be raiſed here, as was in the originally diſtempered Subject.

This may be one, but there is perhaps another yet more dangerous Manner of *Infection*, and that is, by the Breath of the

Diſeaſed taken in by a By-ſtander, eſpecially in the laſt Moments, ſeizing the *Stomach*, and fixing a *Malignity* there. For it is upon this Score, that thoſe who are *infected* do preſently complain of an extreme Pain and *Nauſea* in the upper Orifice of the Stomach; and that all Authors do agree in the admirable Uſe of *Vomits* timely given in this Caſe; theſe by their ſtimulating Force removing the very *Minera* of the Diſeaſe; and likewiſe that, oftentimes in *Peſtilential* Illneſſes, the *Stomach*, when open'd, has been found gangren'd and mortified. This made *Van Helmont*, who had obſerved this Part, in one kill'd by a *Plague Infection*, perforated and eroded in ſeveral Places, no otherwiſe than he had ſeen in one poiſon'd by *Arſenick*, conclude, that the Plague for the moſt Part begins in the Stomach from a coagulated *Tartar* there.

Herein lies the Difference of *Contagion*, from the firſt Invaſion of malignant Diſtempers; the Effects of the one are the Cauſe and Beginning of the other; and therefore it is no Wonder, if tho' the Symptoms in the former are by a gradual Increaſe wrought up to their Height, they do however in the latter, even at the very firſt, diſcover their ill Nature and Violence, and, like a reinforc'd Enemy, by ſurer Strokes make quicker Diſpatch. And this alſo is the Reaſon of the great Increaſe of *Funerals* in Plague-time, in that one Death is thus added to another.

If it be difficult to explain the particular Manner how the *Stomach* comes to be thus affected, we muſt not therefore deny Matter of Fact; and may however probably conjecture, that the laſt *Breath* of one dying of a malignant Diſtemper proves thus pernicious, in that thoſe fermenting active Particles, which, as we juſt now obſerved, the Blood diſcharges upon the Glands of the *Mouth*, *Stomach*, *Lungs*, *&c.* impregnating the Air in its Paſſage through theſe; when the ſame happens to be immediately inſpired by a ſound Perſon, it may eaſily taint the *Salival* Juices in the Mouth, which are very glutinous, and of a fermenting Nature, and therefore ſuſceptible enough of *Contagious Effluvia*, but eſpecially of ſuch as proceed from the ſame Liquor infected in the Sick Party. Now the *Spittle* is continually ſwallowed down into the Stomack, and ſo will quickly impreſs its *Labes*, or ill Quality, on ſo tender and ſenſible a Part; that is, will lodge theſe corroſive *Salts* (for ſuch we may ſuppoſe the Particles of Infection) in the ſecretory Ducts; whereupon the Glands being obſtructed, little *Tumors* are by the Afflux of their Fluid rais'd here and there, which breaking become ſmall *Ulcers*, and produce that diſmal Train of Symptoms which we have already related.

And here it may not be amiſs to take Notice, that all Authors do agree, one great Cauſe of *Peſtilential* Diſtempers, eſpecially in Armies and Camps, to be dead Bodies lying expoſed and rotting in the open Air; the Reaſon of which is plain from what we have been advancing; for Battels being generally fought in the Summer-time, it is no Wonder, if the Heat acting upon the unburied *Carcaſſes*, and *fermenting* the Juices, draws forth thoſe active Particles, which in great Quantities filling the Atmoſphere, when they are inſpired and let into the Stomach, do affect it after the Manner already deſcribed.

To illuſtrate this Matter, I ſhall relate a remarkable Story told me by the learned Dr. *Baynard*. The Body of a Malefactor was hung up in Chains in the Country; after a few Months, in very hot Weather, it was Sport and Paſtime to ſome Boys playing thereabouts, to ſwing the Carcaſs up and down; one more bold than the reſt ſtruck it with his Fiſt upon the naked Belly, which being outwardly parch'd and dry, and from the falling down of the Humours ſwell'd and tenſe, was eaſily burſt by the Blow; out guſh'd a Water ſo corroſive and fiery, that running down the poor Lad's Arm, it cauſed a violent *Excoriation*, and a very hard Matter it was to preſerve it from being truly mortified. What this *Serum* could do upon the outward Skin, the more volatile Parts of it would, without all Doubt, effect upon the more tender and ſenſible Membranes of the *Stomach*, if a conſiderable Number of them were fixed there; the Fluids of humane Bodies being ranker, and more abounding in active Salts, than thoſe of other Creatures, which are not continually repaired and nouriſh'd by the Juices of Animals.

The Way by which *bad Food, ill ripen'd Fruits* of the Earth, *&c.* do oftentimes produce *Malignant* and *Peſtilential* Diſeaſes, is not very different from that by which we have obſerv'd unwholeſom Airs to be the Cauſe of the like Effects. For the Juices with which thoſe do ſupply the Blood being corrupted, muſt neceſſarily make a Fluid of quite other Properties than what the animal Oeconomy requires, that is, neither fit for Nutrition, nor for the Secretion of thoſe Liquors which in the ſeveral Organs are to be derived from it; whereupon the ſmall *Tubes* are obſtructed by an unequally glutinous *Slime*; and it is therefore no Wonder, if, beſides the other Symptoms enſuing, *ſore Puſtules, Inflammations, Ulcers, &c.* (more common in Fevers from this Cauſe than in any other) are raiſed in the Surface of the Body.

This is the Ground of the common Obſervation, that a *Famine* is very often ſucceeded by a *Peſtilence*. And this *Calamity* generally begins amongſt the poorer Sort of People, whoſe Diet to be ſure is the worſt.

The City of *Surat* in the *Eaſt-Indies* is ſeldom or never free from the Plague; and yet it is obſerved, that the *Engliſh* who trade there are in no Danger of being infected thereby. Now the Chief of the Natives in this Place are *Banians*, who neither eat Fleſh, nor drink Wine, but live very poorly upon *Herbs, Rice, Water, &c.* and moſt of the Inhabitants do the like, except Foreigners. This poor Fare, together with the Heat of the Climate, makes them ſo liable to malignant Diſtempers; from the Attacks of which, thoſe who feed well are more ſafe and ſecure.

Thus much concerning *Poiſonous Exhalations and Airs*, ſo far as the Conſideration of the *Grotta de Cani* has led us on to enquire into their Effects; for tho' there may be other Alterations of this ſame Element, differing in their Nature from this we have inſiſted upon, and yet equally pernicious and hurtful, yet we take no Notice of any of them, in regard that thoſe which are from *Arſenical, Mercurial*, and the like *Fumes*, are reducible to a foregoing *Eſſay*; and thoſe which are owing to a Change of the known Properties of the Air, may be eaſily explain'd by what has been already delivered in this. I ſhall therefore rather chuſe to make ſome Remarks on the Miſchief of another *Fluid*, which as it is the next in Uſe to this we have been treating of, ſo the bad Qualities of it, when it comes to be altered, muſt neceſſarily be almoſt equally fatal and dangerous.

I mean *Water*, which is of ſo conſtant Service, not only for our Drinks, but alſo in preparing of our Fleſh and Bread, that it may juſtly be ſaid to be the *Vehicle* of all our Nouriſhment; ſo that whenever this happens to put on other Properties than are neceſſary to fit it for this Purpoſe, it is no Wonder if, in its Paſſage through the Body, theſe do make ſuitable Impreſſions there.

Thus at *Paris*, where the Water of the River *Seine* is ſo full of ſtony Corpuſcles, that even the Pipes through which it is carried, in Time are incruſted and ſtopt up by 'em, the Inhabitants are more ſubject to the *Stone* in the Bladder than in moſt other Cities. The ſame I obſerved in the *Baths* of *Abano*, a few Miles from *Padua*, to that Degree, that it is neceſſary very frequently to clear the Wheel of a Mill driven by the Current of theſe Springs, from the great Quantity of *petrified* Matter with which it is from Time to Time incumbered.

In like Manner, let the groſs Particles with which the *Water* is ſaturated be of any other Nature, *Metallick Salts, &c.* theſe, according to their various Gravity, the Capacity of Canals, and ſuch like Circumſtances, will, when they come to circulate in the animal Body, be by the Laws of Motion depoſited in one Part or other. So thoſe Mineral Bodies, and Nitrous Salts, which abound in the Snowy Waters of the *Alps*, do ſo certainly ſtuff and inlarge the Glands of the Throat in thoſe who drink 'em, that ſcarce any who live there are exempted from this Inconvenience.

For this Reaſon, the Choice of *Water* for Drink among the Ancients was by Weight, the lighteſt being preferr'd, as moſt free from all heterogeneous Bodies.

The Caſe therefore of *Poiſonous Springs* is, their having corroſive Corpuſcles mixt with their Water, which cannot fail, when forſaken in the Canals of the Body of their Vehicle,

Diſeaſed taken in by a By-ſtander, eſpecially in the laſt Moments, ſeizing the *Stomach*, and fixing a *Malignity* there. For it is upon this Score, that thoſe who are *infected* do preſently complain of an extreme Pain and *Nauſea* in the upper Orifice of the Stomach; and that all Authors do agree in the admirable Uſe of *Vomits* timely given in this Caſe; theſe by their ſtimulating Force removing the very *Minera* of the Diſeaſe; and likewiſe that, oftentimes in *Peſtilential* Illneſſes, the *Stomach*, when open'd, has been found gangren'd and mortified. This made *Van Helmont*, who had obſerved this Part, in one kill'd by a *Plague Infection*, perforated and eroded in ſeveral Places, no otherwiſe than he had ſeen in one poiſon'd by *Arſenick*, conclude, that the Plague for the moſt Part begins in the Stomach from a coagulated *Tartar* there.

Herein lies the Difference of *Contagion*, from the firſt Invaſion of malignant Diſtempers; the Effects of the one are the Cauſe and Beginning of the other; and therefore it is no Wonder, if tho' the Symptoms in the former are by a gradual Increaſe wrought up to their Height, they do however in the latter, even at the very firſt, diſcover their ill Nature and Violence, and, like a reinforc'd Enemy, by ſurer Strokes make quicker Diſpatch. And this alſo is the Reaſon of the great Increaſe of *Funerals* in Plague-time, in that one Death is thus added to another.

If it be difficult to explain the particular Manner how the *Stomach* comes to be thus affected, we muſt not therefore deny Matter of Fact; and may however probably conjecture, that the laſt *Breath* of one dying of a malignant Diſtemper proves thus pernicious, in that thoſe fermenting active Particles, which, as we juſt now obſerved, the Blood diſcharges upon the Glands of the *Mouth*, *Stomach*, *Lungs*, *&c.* impregnating the Air in its Paſſage through theſe; when the ſame happens to be immediately inſpired by a ſound Perſon, it may eaſily taint the *Salival* Juices in the Mouth, which are very glutinous, and of a fermenting Nature, and therefore ſuſceptible enough of *Contagious Effluvia*, but eſpecially of ſuch as proceed from the ſame Liquor infected in the Sick Party. Now the *Spittle* is continually ſwallowed down into the Stomack, and ſo will quickly impreſs its *Labes*, or ill Quality, on ſo tender and ſenſible a Part; that is, will lodge theſe corroſive *Salts* (for ſuch we may ſuppoſe the Particles of Infection) in the ſecretory Ducts; whereupon the Glands being obſtructed, little *Tumors* are by the Afflux of their Fluid rais'd here and there, which breaking become ſmall *Ulcers*, and produce that diſmal Train of Symptoms which we have already related.

And here it may not be amiſs to take Notice, that all Authors do agree, one great Cauſe of *Peſtilential* Diſtempers, eſpecially in Armies and Camps, to be dead Bodies lying expoſed and rotting in the open Air; the Reaſon of which is plain from what we have been advancing; for Battels being generally fought in the Summer-time, it is no Wonder, if the Heat acting upon the unburied *Carcaſſes*, and *fermenting* the Juices, draws forth thoſe active Particles, which in great Quantities filling the Atmoſphere, when they are inſpired and let into the Stomach, do affect it after the Manner already deſcribed.

To illuſtrate this Matter, I ſhall relate a remarkable Story told me by the learned Dr. *Baynard*. The Body of a Malefactor was hung up in Chains in the Country; after a few Months, in very hot Weather, it was Sport and Paſtime to ſome Boys playing thereabouts, to ſwing the Carcaſs up and down; one more bold than the reſt ſtruck it with his Fiſt upon the naked Belly, which being outwardly parch'd and dry, and from the falling down of the Humours ſwell'd and tenſe, was eaſily burſt by the Blow; out guſh'd a Water ſo corroſive and fiery, that running down the poor Lad's Arm, it cauſed a violent *Excoriation*, and a very hard Matter it was to preſerve it from being truly mortified. What this *Serum* could do upon the outward Skin, the more volatile Parts of it would, without all Doubt, effect upon the more tender and ſenſible Membranes of the *Stomach*, if a conſiderable Number of them were fixed there; the Fluids of humane Bodies being ranker, and more abounding in active Salts, than thoſe of other Creatures, which are not continually repaired and nouriſh'd by the Juices of Animals.

The Way by which *bad Food, ill ripen'd Fruits* of the Earth, *&c.* do oftentimes produce *Malignant* and *Peſtilential* Diſeaſes, is not very different from that by which we have obſerv'd unwholeſom Airs to be the Cauſe of the like Effects. For the Juices with which thoſe do ſupply the Blood being corrupted, muſt neceſſarily make a Fluid of quite other Properties than what the animal Oeconomy requires, that is, neither fit for Nutrition, nor for the Secretion of thoſe Liquors which in the ſeveral Organs are to be derived from it; whereupon the ſmall *Tubes* are obſtructed by an unequally glutinous *Slime*; and it is therefore no Wonder, if, beſides the other Symptoms enſuing, *ſore Puſtules*, *Inflammations*, *Ulcers*, *&c.* (more common in Fevers from this Cauſe than in any other) are raiſed in the Surface of the Body.

This is the Ground of the common Obſervation, that a *Famine* is very often ſucceeded by a *Peſtilence*. And this *Calamity* generally begins amongſt the poorer Sort of People, whoſe Diet to be ſure is the worſt.

The City of *Surat* in the *Eaſt-Indies* is ſeldom or never free from the Plague; and yet it is obſerved, that the *Engliſh* who trade there are in no Danger of being infected thereby. Now the Chief of the Natives in this Place are *Banians*, who neither eat Fleſh, nor drink Wine, but live very poorly upon *Herbs*, *Rice*, *Water*, *&c.* and moſt of the Inhabitants do the like, except Foreigners. This poor Fare, together with the Heat of the Climate, makes them ſo liable to malignant Diſtempers; from the Attacks of which, thoſe who feed well are more ſafe and ſecure.

Thus much concerning *Poiſonous Exhalations and Airs*, ſo far as the Conſideration of the *Grotta de Cani* has led us on to enquire into their Effects; for tho' there may be other Alterations of this ſame Element, differing in their Nature from this we have inſiſted upon, and yet equally pernicious and hurtful, yet we take no Notice of any of them, in regard that thoſe which are from *Arſenical*, *Mercurial* and the like *Fumes*, are reducible to a foregoing *Eſſay*; and thoſe which are owing to a Change of the known Properties of the Air, may be eaſily explain'd by what has been already delivered in this. I ſhall therefore rather chuſe to make ſome Remarks on the Miſchief of another *Fluid*, which as it is the next in Uſe to this we have been treating of, ſo the bad Qualities of it, when it comes to be altered, muſt neceſſarily be almoſt equally fatal and dangerous.

I mean *Water*, which is of ſo conſtant Service, not only for our Drinks, but alſo in preparing of our Fleſh and Bread, that it may juſtly be ſaid to be the *Vehicle* of all our Nouriſhment; ſo that whenever this happens to put on other Properties than are neceſſary to fit it for this Purpoſe, it is no Wonder if, in its Paſſage through the Body, theſe do make ſuitable Impreſſions there.

Thus at *Paris*, where the Water of the River *Seine* is ſo full of ſtony Corpuſcles, that even the Pipes through which it is carried, in Time are incruſted and ſtopt up by 'em, the Inhabitants are more ſubject to the *Stone* in the Bladder than in moſt other Cities. The ſame I obſerved in the *Baths* of *Abano*, a few Miles from *Padua*, to that Degree, that it is neceſſary very frequently to clear the Wheel of a Mill driven by the Current of theſe Springs, from the great Quantity of *petrified* Matter with which it is from Time to Time incumbered.

In like Manner, let the groſs Particles with which the *Water* is ſaturated be of any other Nature, *Metallick Salts*, *&c.* theſe, according to their various Gravity, the Capacity of Canals, and ſuch like Circumſtances, will, when they come to circulate in the animal Body, be by the Laws of Motion depoſited in one Part or other. So thoſe Mineral Bodies, and Nitrous Salts, which abound in the Snowy Waters of the *Alps*, do ſo certainly ſtuff and inlarge the Glands of the Throat in thoſe who drink 'em, that ſcarce any who live there are exempted from this Inconvenience.

For this Reaſon, the Choice of *Water* for Drink among the Ancients was by Weight, the lighteſt being preferr'd, as moſt free from all heterogeneous Bodies.

The Caſe therefore of *Poiſonous Springs* is, their having corroſive Corpuſcles mixt with their Water, which cannot fail, when forſaken in the Canals of the Body of their Vehicle,

hicle, to do the ſame Miſchief as they would if taken by themſelves undiluted; only with this Difference, that they may in this Form be carried ſometimes farther into the the animal Oeconomy, and ſo having paſs'd the *Primæ Viæ*, diſcover their Malignity in ſome of the inmoſt Receſſes. Thus the *Fons Ruber* in *Æthiopia*, mentioned by *Pliny*, about which Abundance of native *Minium* or *Cinnabar* was found, ſhew'd its ill Effects chiefly on the Brain; and therefore *Ovid* ſays of it,

--------- *Si quis Faucibus hauſit*
Aut Furit aut patitur mirum gravitate Soporem.

We ſhall not need then to inlarge on this Matter, ſince any of the foremention'd *Mineral Poiſons* may thus impart their deadly Quality to Waters; and accordingly there are Inſtances of *Arſenical*, *Mercurial*, *&c.* Fountains, of which the Hiſtories may be ſeen in the Collections of the learned *Baccius*, and one very remarkable in the *Philoſophical Tranſactions.*

But as we before took Notice concerning *Airs*, ſo it may be worth the while to obſerve of *Waters*; that there are ſome Alterations of them, which tho' not properly *Poiſonous*, yet are of ſo great Conſequence in their Effects, that they may very well deſerve to be regarded.

This I ſhall do with Reſpect to a great Abuſe committed in this Kind about the City; and that is, in the chuſing of ſtagnating impure *Well-Water* for the *Brewing* of *Beer*, and making other Drinks. Such a Fluid indeed has oftentimes a greater Force and Aptneſs to extract the Tincture out of *Malt*, than is to be had in the more innocent and ſoft Liquor of Rivers; but for this very Reaſon it ought not, unleſs upon meer Neceſſity, to be made Uſe of; this Quality being owing to the *Mineral* Particles and *Aluminous* Salts with which it is impregnated.

A late *Author*, by ſearching into the firſt Accounts of the Diſtemper we call the *Scurvy*, deſcrib'd by *Pliny* and *Strabo* under the promiſcuous Names of *Stomacace* and *Sceloſyrbe*, and examining the authentick Hiſtories of it in later Years, made by the moſt obſerving Phyſicians in thoſe Countries where it was unhappily revived, as *Olaus Magnus*, *Balduinus Ronſeus*, *J. Wierus*, *Solomon Albertus*, *&c.* finds, that the Origine of it was in all Times and Places charged upon the Uſe of unwholeſom ſtagnating *Waters*. Then by comparing together the *Clayie Strata* of the Earth about the Cities of *London*, *Paris*, and *Amſterdam*, he ſhews, that where the Water is worſt, there this Malady is moſt rife. So that he has put it out of all Doubt, that moſt of the perplex'd and complicated Symptoms which are ranged under this one general Name, if they do not entirely owe their Birth to the Malignity of this Element, do however acknowledge it to be their main and principal Cauſe.

And indeed *Hippocrates* himſelf, as he has very plainly decipher'd this Diſeaſe by the Title of Σπλῆνες μέγαλοι, or *Great Milts*; ſo he does very particularly in another *Treatiſe* take Notice, that Drinking of *Stagnating Well-Waters* muſt neceſſarily induce an ill Diſpoſition both of the *Milt* and Belly.

If we enquire into the Reaſon of ſuch ill Effects, we muſt conſider, that *Clay* is a *Mineral Glebe*, and that the groſs Particles and Metallick Salts with which Waters paſſing through ſuch a Bottom do abound, are, as Dr. *Liſter* obſerves, not to be maſtered, that is, indigeſtible in the humane Body. Not only therefore will theſe cauſe, as he very well argues, calculous Concretions in the *Kidneys*, *Bladder*, and *Joints*, and, as *Hippocrates* experienced, hard Swellings in the *Spleen*; but they muſt neceſſarily oftentimes, by their corroſive Quality, twitch and irritate the ſenſible Membranes of the Stomach and Bowels, and thus hinder and interrupt the Digeſtion of our Food. Nay, beſides all this, when they come into the Blood, it is no Wonder if the ſmall Canals of inſenſible Perſpiration are frequently ſtopp'd and obſtructed by 'em; for it is upon this Score that *Sanctorius* teaches us, that *heavy Water converts the Matter of Tranſpiration into an* Ichor, *which being retained, induces a* Cachexy.

What Miſchiefs will inſue hereupon every one ſees, not only Pains in the Limbs, livid Spots in the Surface of the Body, Ulcers, *&c.* from the Acrimony of the undiſcharged Moiſture; but many beſides of thoſe

oſe perplexing Symptoms which go by the ame of *Hyſterical* and *Hypochondriacal*, may e their Riſe from the ſame Source; for before cited *Sanctorius* has remark'd, that *Flatus or Wind* ſo inſeparable from thoſe ſes, is no other than *the Fluid of Perſpira- rude and unfiniſhed.*

If theſe Inconveniencies are oftentimes felt, at leaſt not till towards the declining e, in ſtrong and active Habits of Body; I am from very good Experience aſſured, t they deſerve Conſideration in weaker nſtitutions, and a ſedentary Life, eſpecial- of the more tender Sex.

have the Honour to be nearly related to orthy Perſon, who led formerly an af- ted Life from the frequent Returns of vio- *Colick Pains*, till ſhe was with happy ceſs adviſed by the noble *Van Helmont* to drink (as ſhe then did) Beer brewed h *Well-Water*; and her Health is even v ſo far owing to this Management, that an Error in it is unavoidably followed with the wonted Complaints.

For theſe Reaſons *Pliny* tells us, that *thoſe Waters are condemned in the firſt Place, which when boiled do incruſtate the Sides of the Veſſels*: And that our *Well-Waters* do this, no Body who looks into the *Tea-Kettles* of our Gentlewomen can be ignorant.

And indeed in ancient Times, when Phyſick was more a Science, which is now more a Trade, as that Part of it which relates to *Diet* was more carefully ſtudied than it is now-a-days; ſo this Point particularly of which we are treating was of ſo great Moment, that *Hippocrates*, who wrote the beſt Book on the Subject that ever was publiſh'd, has in a great Meaſure accounted not only for the Diſeaſes, but even for the Temper and Diſpoſition, of the People of ſeveral Countries, from the Difference of the *Waters* with which Nature has ſupplied them.

---

a Diſeaſes: *Or, A Treatiſe of their Nature, Cauſes, and Cure. Alſo an Eſſay on Bleeding in Fevers, ſhewing the Quantities of Blood to be let in any of their Periods. By* W. Cockburn, M. D. *late Phyſician of His Majeſty's* Fleet, *Fellow of the* R. S. *and of the College of Phyſicians,* London: *The Second Edition, printed in* 1706.

THE Doctor ſays, that finding the Book as acceptable to Strangers far removed from the Sea, as it was to Seafaring People; he has in this Edition avoured to make it agreeable to the oretical Reader aſhore. It was tranſlated *Low-Dutch* by the learned Profeſſor *Bid-* and the States ordered every Surgeon be- ing to their Ships to get one of 'em; h alone is enough to recommend its ulneſs.

he Doctor firſt enquires how the Way ving at Sea, eſpecially the Narrow- where theſe Obſervations were made, diſpoſe Seafaring People to Diſeaſes, and what Diſeaſes they are moſt ſubject to on that Account: Next he hints at the Difference between them and thoſe in hotter Countries, relates the Hiſtory of ſome Years, and lays down proper Indications for Cure.

The Victuals allowed them in Men of War for their daily Food, are, Pork and Peaſe on *Sundays* and *Thurſdays*; on *Mondays*, Oatmeal (Burgoo), Butter and Cheeſe; On *Tueſdays* and *Saturdays*, Beef and Pudding, or all Beaf; on *Wedneſdays* and *Fridays*, Butter and Cheeſe, or Oatmeal and Peaſe, and with theſe a large Proportion of Bread. The Victuals themſelves are as good

of

of the Kind, as any where to be found, and the Allowance greater than may ſatisfy any ordinary Eater. Their Drink is good Table Beer, in what Quantity they pleaſe. Only it were to be wiſh'd that they might have more proper Victualling in the Time of their Recovery from Sickneſs, when this Kind of Food is really hurtful, and cauſes Two thirds of the Scurvies that abound among Seamen.

Salt Victuals are known by Experience to be the hardeſt to digeſt, and by Conſequence the moſt unfit for a quick or plentiful Supply of thoſe Parts that are to repair the Decays of the Body. Beſides, an Indigeſtion of Pork, which is of great Nouriſhment, produces worſe Effects than Meats that nouriſh leſs, as is manifeſt by Statical Phyſick; therefore groſs Aliment, and the Quantity of undigeſted Food, do powerfully diſpoſe them to Diſtempers which are compleated in ſome Form or Appearances of our ordinary Diſeaſes, according as various Circumſtances concur in their Production. Yet, after all, the Bodies of ſuch working People not only make the beſt of this ſolid Food, and continue long in perfect Health, but it alſo ſeems neceſſary; for thoſe who uſe little or no Exerciſe, are ſcarce able to reduce ſuch ſolid and parch'd Food into Chyle after 12 or 15 Hours; and when that is done, this Chyle being groſs, and with great Difficulty performing its firſt Voyage through the Lacteal Veſſels, affords but a groſs Supply to the Blood, and therefore muſt diſpoſe ſuch People to Dropſies, Jaundice, and other Cachectical Diſeaſes, which are only to be prevented by keeping the Sailors cloſe to their Work, becauſe Labour helps their Digeſtion, whereas thoſe who are lazy, or uncapable of Working about the Ship, as preſs'd Landmen, *&c.* are generally over-run with the Scurvy.

This Diſeaſe appears firſt with red Spots in their Arms and Legs, eſpecially where they afterwards turn black or blue, attended with an extraordinary Weakneſs in the Patients, and a Redneſs, Itching and Rottenneſs, of the Gums; Looſeneſs of Teeth, and an unequal Pulſe, ſometimes very high, at other Times very low.

The Victuals above mentioned affects the Sailors when they are not able to move, and have a weak Digeſtion; for Indigeſtion ... the firſt Concoction yields a very groſs Chy... which is not eaſily converted into Blo... and by this Means Tranſpiration and ... other Secretions muſt be diminiſhed, wh... augments the Quantity of Blood, and t... Increaſe muſt be in Proportion to the Im... diment of Tranſpiration, and Inequality ... the other Secretions. A Quantity of Bl... more than what is natural, endued with ... proportionable Quantity of Motion, m... ſtrike harder upon the reſiſting Sides of t... Arteries, and the more that they are infect... and this Force by which it falls on th... Sides may be greater than their Power of C... hæſion, and therefore Blood breaking th... its Canals, will run out in a Quantity t... bears a Proportion to its impelling For... the Greatneſs of the Wound that is ma... and the Reſiſtance of the Place into wh... it falls; ſo that if the Place be ſuperfici... if any ſufficient Quantity is diſcharged, a... the Quality of the Blood ſo groſs that t... perſpired Matter is not ſufficient to keep ... fluxil by its Quantity and Force, in t... Caſe the extravaſated Blood will corrup... ter the ſame Manner, and in that very O... der, we find it does when out of the bo... Regard always being had to the Quanti... diſcharged, and the Place where it is lodg... that is, the Blood thus excluded being ... State of Reſt, does corrupt, and in the di... rent Tranſitions, in the Time of this C... ruption, is black, blue, *&c.* as we ſee in t... preſent Caſe, and others of the like N... ture: Only it is longer in corrupting, ... cauſe of its little Quantity, the Fluxility ... the perſpiring Steams, and the Warmth ... the Place, as might be demonſtrated at g... Length. Theſe mechanical Hints, ſays ... Doctor, do fairly deliver us from the N... ceſſity ſome Men are brought under of ... knowledging an abſorbing Power, w... they account for the Vaniſhing of th... Spots at a Time they are not converted i... Matter or *Pus*. It has been obſerved, ... they, that Glands have ſometimes been ſo... obſtructed and filled with a Liquor, the ... whereof has been found lying in great A... dance in the neighbouring Parts; and ... this they conclude, that this Liquor has ... ſuck'd up out of theſe adjacent Parts ...

he Glands. I wiſh, ſays the Doctor, they ould have diſcovered by what Machine, ump, or ſuch like Inſtrument, lodg'd in hoſe Glands, this Liquor has been drawn p. Certainly it had been more agreeable o the ſecreting Power, with which we know he Glands are endued, to have concluded hat this Liquor, collected in that Abundance, as to be diſcharged out of thoſe Glands; nce this their Power is manifeſt, and the her unknown.

'Tis known that every Change of Poſture by the Contraction of the Muſcles, and theſe are more or leſs vigorouſly perform'd, e meaſure our Strength. The Power and orce of theſe Muſcles are in a triplicate Proortion to the Quantity of Blood in its atural Condition; but the Blood in this aſe being viſcid, we are only to eſtimate r Strength by the Quantity of Spirits that n be ſecreted from it, and therefore the nimal indued with ſuch Blood in a greater uantity, is but in the Condition as if it d one half leſs.

Moreover ſince the Heart is a Muſcle, 'tis e more weakly contracted, becauſe of a leſs uantity of Spirits deriv'd into it; and nce 'tis evident, that the Motion of the ood is as the Force by which the Heart is ntracted, and the Contraction of the eart being weaker, ſo is the Motion of the ood; and this Motion being leſs and leſs, e further the Blood proceeds in Arteries om the Heart, 'tis the eaſier ſtopp'd in its otion; and becauſe of this obſtructing wer, and the Power by which 'tis proll'd, the reſiſting Arteries are broke thro'; erefore it is in theſe extreme Parts, where ere are likewiſe great Numbers of the akeſt Arteries, that theſe Eruptions of ood are, and theſe black and blue Spots found.

After the ſame Manner comes the Inequay of the Pulſe, for that being made by a eater Quantity of Blood propell'd out of wider Part of an Artery into a ſmaller or rrower, at every Time the Heart is conacted, the Pulſe is ſtronger or weaker, acrding to the Quantities of Blood and mes of Contraction.

This ill State of the Blood, which ocſioned Spots and Eruptions in the exme Parts, does in a lower Degree of the ſame Operation produce Humours of different Sorts, as the Nature of the obſtructed Parts will bear; for this thicker Blood being driven through larger Capillaries, in Places not ſo far from the Heart, its Force in them will be greater than in the capillary Veſſels at the Extremities, and conſequently thoſe Veſſels will not be ſo eaſily obſtructed as in the Extremities: Yet ſince this thick Blood does not all of it paſs the Veſſels at the ſame Time 'tis impell'd into them, as commonly it does when the Blood is in an ordinary State; the Quantity of Blood contained in theſe Canals is greater than ordinary, and this greater Quantity of Blood ſtretches its Veſſels by lengthening their Diameter, which alſo does enlarge the Dimenſions of the Part to whoſe Compoſition thoſe Blood Veſſels go; and this Swelling is more or leſs conſpicuous, as are other Circumſtances join'd with it. Moreover as this univerſal Indiſpoſition of the Blood does affect univerſally, while it moves through Canals equally diſpoſed; ſo theſe Tumors only differ as to the Condition of the Parts that are obſtructed; and therefore as the Gums do conſiſt of a Number of nine of the ſmalleſt Veſſels, and they inveſt Bones, ſo their Obſtruction muſt more eſpecially produce Tumors that have the ſame Colour the Blood has, or Tumors with Inflammation, or the Gums are ſwell'd and red.

And as theſe obſtructed Parts are pure Blood, ſo that common Conſequents of ſuch an Obſtruction will be a Gangrene, *viz.* a total one, and Ulcers more or leſs malignant, with better and worſe *Pus*, according to the Goodneſs of the Blood, and Warmth of the Parts where 'tis generated; ſo that the Ulcers being foul and ſtinking, the *Pus* is likewiſe naught.

Yet before this total Obſtruction, the Parts of the Blood being tranſpired, tho' not perhaps in their natural Quantity, nor in the ordinary Time; but theſe tranſpired Parts coming from groſs Blood, are not well comminuted, nor ſo fine as naturally they ought to be; nay, perhaps they conſiſt of very ſolid and ſalt Parts. Now becauſe of this Groſſneſs and Solidity of Particles, they rub more upon the Sides of Veſſels, and the ſmall Canals, through which they are perſpired; and by this their Friction excite the

Senſe of Itching. The Deſire of Eaſing us of this Kind is ſometimes of good Uſe, and contributes very much to prevent this Obſtruction, by which *Pus* is to be generated; for by rubbing the Parts that itch, ſome of the tender Veſſels of the Gums are broke, and the Blood that guſhes out, not only leaves more Room for the reſt of the Blood in the ſame Canals, but may contribute very much to the better Circulation of other Blood impelled into theſe Veſſels long after.

By viſcid Blood, tho' in a greater Quantity, the Teeth are not ſo firmly retain'd in their Sockets, as when the Blood is in a State of due Fluidity; and far leſs is it ſo in Diſcharges of Blood from inflamed Gums; and ſtill leſs when the Gums are waſted by ſharp *Pus* diſcharged in a great Quantity: But being by this Compreſſion of the Teeth on every Side that they have their Stability, and they being leſs forcibly compreſs'd, as is ſaid, they muſt become leſs firm, and be looſe.

The Doctor having thus given us an Account of the Symptoms of the Scurvy, and how Seamen come to be affected with it, he comes next to conſider their *Bread*, of which every Man is allowed a Pound *per* Day. Moderate eating of Bread has always been allowed to contribute much to the preſerving of Health, but a Surfeit of Bread is the worſt of all others: The Subſtance of it being tough and tenacious, 'tis not ſo eaſily broken and divided by the Stomach; and if eaten in greater Quantity than ſufficient to give a Body to the Chyle, 'tis apt to occaſion Obſtructions, and thick groſs Humours; as an entire Abſtinence from Bread deprives the Chyle of that Body which is neceſſary to make its Paſſage ſlow enough through the Guts, and occaſions Gripings, Looſeneſſes, and ſuch other Diſtempers as attend them. Having premiſed thus much, he conſiders the Effects that Sea-Biſket may have upon the Mariners.

1. A Pound of Bread ſo dry and ſolid as that muſt be for keeping, if brought to the Conſiſtence of common Bread, would be near twice as big as it is, and this he thinks too much for Men generally to eat. Beſides, when ground by the Teeth, and ſent to the Stomach, 'tis very hard to be digeſted, if not very fine; and if fine, it ſo imbibes the ſmall Quantity of Chyle that is made of the other Victuals, that the Maſs of Blood receives a very ſmall Quantity of it, and that Maſh which paſſes the Guts where the Lacteal Veſſels are inſerted, is ſo harden'd and compacted, that it occaſions Coſtiveneſs, which is of very ill Conſequence, eſpecially at Sea, produces many other Maladies, and always obſtructs the Cure of Fevers; for when our Inteſtines are ſtuffed with a great many Days Victuals, they are ſo diſtended, and the Blood Veſſels in them ſo preſs'd or ſtraiten'd, that the Circulation through them is very much interrupted, and not only the Blood which uſed to flow that Way, but even that of the neighbouring Parts, is forced from its Channels, and equally filling the Channels of the reſt of the Parts of the Body, that have leſs Reſiſtance in ſome Degree, preſs the Origine of the Nerves in the Brain, and Blood Veſſels of the Eyes, and ſo produce that Stupor and Thickneſs of Sight People frequently feel in that Caſe. Beſides, the Chyle muſt needs be very much interrupted, and kept from being convey'd in a ſufficient Quantity for recruiting the Maſs of Blood, by the Preſſure of the Lacteal Veſſels which are interwoven with the Guts; for the Chyle is forced along the whole Length of the Guts with the groſſer Maſh, and ſo the Body is not only deprived of its neceſſary Nouriſhment, but there is an eminent Hazard of Obſtructions in the Lacteal Veſſels, which very often produce thoſe dangerous *Aſcites* that are ſeldom cured.

The Doctor, in the next Place, ſhews ſome other more common Conſequences of Men's catching Cold: Firſt, he ſays, 'tis known, that the Quantity of the Blood is not always augmented equally, in Proportion to the Suppreſſion or Interruption of Perſpiration; and therefore the Matter thus detained, in an interrupted Tranſpiration, is diſcharged by other Parts of Evacuation, and is the Cauſe, as well as the Matter, of theſe extraordinary Diſcharges. But ſuppoſing that any Part of it is ſecreted in a greater Quantity by the Glands of the Inteſtines, Stomach, or *Pancreas*; the Liquor thus ſecreted will

will make every Thing more liquid in the Stomach and Inteſtines. Beſides, if it is endued with ſharp Parts, it may ſtimulate the Guts alſo; and both by the Liquidneſs of the Excrements, and by augmenting the peiſtaltical Motion of the Inteſtines, thoſe Excrements are protruded out by the *Anus* with great Force; *i. e.* the Matter of inſenſible Perſpiration being thus thrown upon the Guts, will occaſion a *Diarrhœa*: For that is nothing elſe than a more frequent going to Stool, with Slime, Gall or other Humours, becauſe of an extraordinary Contraction of the Guts, an Increaſe of Excrements, their greater Liquidity; of moſt (if not all) of 'em together.

He obſerves, That this Diſtemper is not ſo frequent in the Channel and other Parts, where he made theſe Obſervations, and therefore does not inſiſt much upon it, but refers for a further Account of it to a Book called, *Alv. pro Fluv.*

Having thus made it manifeſt, that there are two very different Affections of the Blood ariſing from catching of Cold; he ſays, there's a third which happens from no aſſignable Circumſtances, though 'tis not eſſentially different from the firſt Caſe mentioned. The Blood and other Humours contract ſuch a Lentor or Thickneſs as has been already obſerved, yet after paſſing through the various Periods above related, it does not acquire a due Temperament and Compoſition, or Health does not enſue, as in the former Caſe; but the Diſeaſe returns, and deſcribes more ſuch Periods to an indefinite Time, and that either by a freſh Supply of new Matter that is able to produce this Affection entirely, or by the Means only of the former Lentor not being thoroughly diſſolv'd: Yet in the Intervals of the forming theſe new Periods, Men ſeem to be in perfect Health, till ſuddenly attack'd by this new Paroxyſm of an Ague, which the Doctor deſcribes as follows:

1. They feel a Coldneſs after Dinner, their Lips are pale, they tremble, their Pulſe is weak, they lie inſenſible, while ſometimes their external Senſes are ſound, and ſometimes faulty, while their Minds are clear, their Body ſtiff like a Corps, and they have a great Drought; yet inſtead of Death, which one would expect by thoſe Appearances, come Warmth and Heats, which continue ſome Time, and end in Sweating. At this Time the Pulſe is ſtrong, and more frequent; they have a Beating in their Head, a great Drought, and after Sweating, they are well to Appearance. It returns every Day, every third, fourth, *&c.* Day incluſive. They recover thoroughly; but ſometimes it ends in Death, and that in the Return.

He afterwards accounts for theſe Symptoms as follows:

1. Coldneſs after Dinner. He ſays, the Thickneſs of the Blood confining its hot and ſmall Parts, is the true and genuine Cauſe of that Coldneſs; and this Thickneſs of the Blood he ſuppoſes to be occaſioned by the Viſcidity of the Chyle join'd to the viſcid Blood; for in an Hour and half after Eating, the Lacteals are found to be full of this Chyle.

2. The Paleneſs of the Lips is occaſioned alſo by the Thickneſs of the Blood, which cannot flow in any Quantity through the Capillary Veſſels.

3. Their Trembling proceeds from the Thickneſs and Weakneſs of the Blood, which is thereby made uncapable of ſupplying a natural Quantity of Spirits to be protruded into the Nerves. Now the Motion of the Spirits being alternate, and their continual Efflux proceeding only from their Abundance in the Nerves, and at preſent the Quantity of Spirits generated being very little, their Efflux is not ſo conſtant, or not perfectly continual, and conſequently the Muſcles into which they are derived are not ſo conſtantly contracted. Their *Æquilibrium* is unequally preſerved, ſometimes one Muſcle, ſometimes another, being interchangeably contracted; and this interchangeable Contraction of antagoniſtical Muſcles being that which Phyſicians call Trembling, 'tis plain that by this Defect of Animal Spirits, Trembling muſt enſue.

4. The Weakneſs of their Pulſe proceeds from the Muſcle of the Heart's being more weakly contracted, becauſe of the Defect of Animal Spirits to drive the Blood out of the Heart with Force through all the Canals.

5. Their lying inſenſible proceeds from the Difficulty the Arteries are under to be reſtored after their Dilatation, ſo that the Nerves are compreſs'd, and by this their Compreſſion the Animal Spirits are derived in a ſmall Quantity, and the Patient is in a Kind of Sleep or Stupor, which may be, while ſuch Diſtentions of Arteries affect little in other Parts: Therefore the Patients may lie inſenſible, while their external Senſes are ſound. On the other Hand, any one, or all the external Senſes, may be defective, while the Mind is clear. This will happen, if we ſuppoſe a Quantity of this thick Blood ſubſiſting about any Artery or *Plexus* of Arteries which involve, or are contiguous to, any Nerve that ſerves for Hearing, Seeing, Taſting, *&c.* For when theſe Arteries are ſtuffed up and filled by the continual Afflux of new Blood, their Sides tend outwards, and are more diſtended, and theſe contiguous Nerves are more compreſs'd, till at length it hinders the Motion of Animal Spirits in thoſe Canals; and by this Means it happens, that a Man may be thick of Hearing, or perfectly deaf, blind, loſe his Taſt, *&c.* yet he may recover them ſuddenly, the Coldneſs being over after the Lentor is protruded into the Veins.

6. That their Body becomes like a Corps is occaſioned thus: During the Lentor, Spirits are not only generated in a ſmall Quantity, and the Sides of Arteries more diſtended than ordinarily, but likewiſe the thick Blood is next to ſtagnating in all its Veſſels; yet in the Time of this defective Quantity of Spirits, they are equally protruded into the Nerves, and conſequently the Muſcles are equally contracted; but by this equal Contraction, the Muſcles and their Antagoniſts remain in *Equilibrio*, and by Conſequence without Motion, or not eaſily brought into it.

7. Their Drought he accounts for thus: The Thickneſs of the Blood diminiſhes Secretions of all Sorts, and among others that of Spittle, ſo that there is a Want of the Afflux of neceſſary Moiſture in thoſe Parts, which occaſions Drought.

8. The Return of Warmth and Heat, inſtead of Death, is occaſioned thus: The Heart, having no antagoniſtical Muſcle, is contracted, while all others are at Reſt, or kept in *Equilibrio* by their equal Contractions; but becauſe the Motion of the Heart is continued, and the Endeavour of the hot Parts to extricate themſelves from this Viſcidity, Heat and Fluidity will be at laſt obtained, according to the different Powers of the Viſcidity and hot Parts, as was ſhewn before. Now if this Motion thus continued is able to diſſolve and comminute this groſs and ſtagnating Blood, the Body that appeared dead and a Corps, will become warm, and hotter for ſome Time than before.

9. The Pulſe becomes ſtronger and more frequent from the ſame Cauſe; for the Spirits being thus derived into the Heart with a greater *Impetus*, its Contraction is ſtronger, and the Blood is impelled into the Arteries very quickly.

10. The Beating in their Forehead comes from the ſame Cauſe; for in this frequent and great Diſtention of the Arteries that run on the hairy Scalp, and in that Part of it about the Ear, upon which we chance to lie, the tending out of their Sides, and their beating on the Pillow, produce this Noiſe we are ſenſible of.

11. Their great Drought happens thus: The Blood not being propell'd to ſuch a Degree as to produce a ſufficient Quantity of Secretions, the Tongue becomes dry: Beſides, the Motion of the Blood being quicker, and the Heat greater, the Spittle, which is ſeparated in a greater Quantity, is ſoon evaporated from off the Tongue, and from this Dryneſs of the Tongue ariſes a Thirſt, which is greater and more intolerable becauſe of the Heat.

12. He accounts for its ending in a Sweat thus: The Lentor of the Blood being diſſolved, and its Velocity increaſed till the Viſcidity is deſtroy'd, Secretions are produced; and the greateſt and moſt ſenſible is by the Pores, which leſſens the Velocity and Heat of the Blood, with the other Adjuncts of a Fever.

13. That the Patient then appears to be well, happens by the removing of the abovementioned Symptoms.

14. The Returns of the Paroxyſms are accounted for thus: Tho' the Paroxyſm is determined by the mentioned Way, yet if the Viſcidity that produced the firſt is not conſumed, but returns in a certain Time; or if it

is conſumed, and purged off by ſome of the nown Ways of Excretion, or ſo commited that 'tis changed into the Nature of ire Blood; yet the Cauſe which produc'd e firſt Lentor will in a certain Time proce the like again, and cauſe the ſame mptoms. There being then two Ways by hich the Returns of a Fit may be made, us ſuppoſe that there are two Returns ery Day, and at the ſame Hour, (the ſame eaſoning will hold good for others that rern in the ſame or any aſſign'd Difference Time) and the firſt is produced by a ntor that laſts for one Day, and therefer is either purged out of the Body, or anged into pure Blood, and the ſecond a Lentor of the ſame Quantity and Quay with that which made the firſt; then y of thoſe Lentors, or any other that can vade at the ſame Hour, and take up a hole Day before 'tis conſumed, may ſucſſively and by Degrees be collected in the ood Veſſels; ſo that it either flows thither enſibly, but conſtantly, in the ſmalleſt rticles, or it may be bred within the ſame, l it can produce a Senſe of Cold, and her Symptoms that attend it. Now be- re this Cold and its Attendants can ſeize it is neceſſary that this Lentor ſubſiſts the Capillary Arteries, which cannot be, leſs its Quantity is ſuch that it does not x with the Blood, and flow with it freely rough the Arteries. Therefore either this at Quantity of Lentor is bred at once in Blood Veſſels, which is poſſible, or elſe derived into them at once from other rts, which is not inconceivable; but 'tis y evident how this very Quantity may w into theſe Veſſels by Degrees, or be d gradually in the ſame. Wherefore 'tis nifeſt that in one Day's Space, either this ntor, or ſomething that breeds it, may get o the Veſſels, and in ſo ſmall a Quantity, t it takes up a whole Day before a ſuffint Qantity is collected to produce the ldneſs and its Attendants; ſo that at the d of a Day the Coldneſs will begin again, d make a new Return. The ſame is true other Returns, not made by the ſame ntor coming again, but by a new one, the mer being quite conſumed. This Conmption may be ſooner or later in the ſame y, according to the different Nature of the Lentor, the Bodies that are mix'd with it, and their Diſſolution in the Increaſe and Declination of the Diſeaſe.

The Doctor comes next to give an Account of the Seamens Oatmeal Victuals, which they call Burgoo. He ſays, 'tis very fit to correct that Thickneſs of the Humors and Coſtiveneſs which are the unavoidable Conſequences of their ordinary Diet and Idleneſs; for Oats being of a thin Subſtance, and that of all the Grains uſed for Victuals from which the greateſt Quantity of Oil may be drawn, they not only preſerve the Motion requiſite to make a due Perſpiration, by adding Spirits to the Blood, but keep it in a convenient Degree of Liquidity, and by their cleanſing Power keep the Belly open. In ſhort, the Doctor thinks Burgoo ſo wholeſom for Seamen, that ſince they generally like it leaſt of all their other Victuals, becauſe, as they pretend, they are not allow'd Butter enough, he wiſhes they had more Sauce to render it more grateful. He ſays the ſame of Peaſe, and that they are of a more temperate Nature, and eſteem'd by *Galen* and other Phyſicians a *Medium* between Things of good and bad Nouriſhment.

Then he gives an Account of their Lodging. He ſays, that what by their pilfering of Hammocks one from another, their lying on or between the Decks when pretty warm after a Can of Flip, and the Preſs'd Men's real Want of Clothes, they contract a Cold, which is the Cauſe of moſt of their Miſeries; tho' he obſerves, that an untimely Uſe of Sweating Medicines in ſome, and thickning Lozenges in others, is more frequently the Cauſe of Fevers, Phthiſicks, *&c.* and more fatal than a Cold, if left to the Strength of the Blood and Abſtinence, without employing any other Auxiliaries. He ſays, that the Force of Perſpiration is only kept up by a certain *Impetus* and Degree of the Blood's Velocity, and that is only interrupted by the Falling or Diminution of this. It would be eaſy to give a more conceivable Account of catching Cold, than is generally aſſign'd to be done by the Nitroſity of the Air.

The Doctor informs us afterwards, that it is agreed on by all Phyſicians, that Perſpiration, when we catch Cold, is not free, as

in

in a natural State, but interrupted, and a great deal of that Subſtance which is uſually ſeparated that Way is detain'd in the Maſs of Blood: What is ſo detain'd proportionably increaſes its Bulk, and fills the Veſſels, which becomes the Source of all thoſe Symptoms that are obſerved to attend a Cold.

Theſe Symptoms are, 1. A Heavineſs, a great Feebleneſs over all the Body, ſudden Weakneſs, a Coldneſs in all the Extremities except the Brain, a Pain in the Bones, and a weak Ear and depreſs'd Pulſe; and ſometimes theſe Symptoms are attended with Sleepineſs. In a Day or two the Pulſe is great and ſtrong, they become warm, reſtleſs and thirſty. Their Tongue is dry, black and rough; their Breathing difficult, and their Breath hot like Fire. They are delirious, and cannot ſleep, and their Sickneſs ends by Sweating, an Hæmorrhage, Looſeneſs, *&c.* or in Death.

He ſays, theſe are the Symptoms that appear moſt conſtantly in Fevers in our narrow Seas, and in this very Order. He comes next to ſhew how theſe Symptoms may proceed from an Interruption in Tranſpiration: Firſt, he ſays, it is evident that a greater Quantity of Blood does make a Weight proportionably great to the augmented Quantity. But then naturally, as the Quantity of Blood is, ſo is the Strength of our Bodies, or its Power to reſiſt this greater Weight; and in that Caſe the added Weight is inſenſible, otherwiſe than in the preſs'd Suppoſition. But, Secondly, we become ſenſible of an extraordinary Weight, when, beſides our own Body, we carry ſome other along with us; and after the ſame Manner we begin to find our own Body heavy, when it either becomes heavier, or retaining the ſame Weight, there happens a Defect either in preparing, ſecreting or deriving, Animal Spirits; for then, *ex Hypotheſi*, there is the ſame, or a greater Weight to be ſupported by a leſs Force; and becauſe of this Inequality of the Weight and Force of our Body, it falls heavier, or we are ſenſible of a more than ordinary Weight. That this may happen ſo by a Quantity of Blood which is more than natural, is very manifeſt; for let it be ſuppoſed that the Blood has no other Defect beſides its greater Quantity, yet becauſe of this its Quantity, the Canals of the Blood are more diſtended than ordinary, and by the like Diſtention of the Arteries to the Brim, its whole Compoſition is proportionably compreſs'd, and by Conſequence the Cavities of the tender Nerves much ſtraiten'd, by which the Spirits are hardly derived into theſe Canals. Now the Strength of the Muſcles being, *cæteris paribus*, as the Quantity of Spirits and their Motion, and the Quantity of Spirits and Motion being leſs by the Difficulty of their being deriv'd into the Nerves, ſo is the Force of the Muſcles likewiſe, and they too being weaker, and the Weight of our Body greater on the ſame, we become ſenſible of its Weight. Moreover it is known the Quantity of Blood cannot be increas'd above a limited Quantity, except its Cohæſion be likewiſe greater, or that ſome Degree of *Lentor* is induc'd into the Blood. Now becauſe of this Lentor the Motion of the Blood and other Liquors is much impeded, and a ſmaller Quantity of Spirits ſecreted, and therefore the Weight of the Body is greater, and its Strength leſs, and we more ſenſible of its Weight. Beſides 'tis known that our daily Heavineſs is on ſome ſuch Account, for by the natural Lentor of all Blood and Secretions, the Velocity of the Blood leſſens to a certain Degree; and without any Regard to the Secretions, the Velocity of our Spirits leſſens $\frac{1}{10000}$ Part in a Second; and therefore an equal Reſpect being had to the Lentor ſuppoſed in the preſent Caſe, this Lentor and Quantity may be increas'd to any Quantity, and ſo may this extraordinary Weight.

The great Feebleneſs proceeds from the Quantity of Blood thus augmented and tainted, as well as from the Spirits being ſeparated in a leſs Quantity, and derived by leſs Force. For this Weakneſs being oppoſed to the ordinary Vigour with which we move, and our Body is carried from one Place to another, which being only performed by the more powerful Actions of our Muſcles, and proceeding too from the Quantity of liquid Blood, and that of the Spirits, theſe Quantities being leſs than natural, as well as leſs powerfully impelled, the Force of the Muſcles, and the Vigour and Agility that attended, muſt be proportionably leſs, and we become feeble.

This

This Feebleneſs is ſudden, contrary to that
oceeding from the Want of Blood, which
commonly the Work of Time; and tho'
haps the Cauſe does not operate ſuddenly,
the Feebleneſs it ſelf is perceived to be
y great, and that felt only ſuddenly; for
6, 8 or 10 Pound were neceſſary to com-
at that Fulneſs which is required to pro-
ce this and the other mentioned Symp-
ns, 'tis certain ſuch a Quantity may be
dily obtained in a little Time, and conſe-
ently its Effects muſt be ſudden. This is
dent from what *Sanctorius* has obſerved,
let the Quantity of what we eat and
nk in one Day not only be 8 Pound, but
newhat leſs, *viz.* 7, 6 and 5, the Quantity
Stools in the largeſt Eſtimate does not ex-
d half a Pound, and the Quantity of our
ter two Pound, the Remainder is waſted
enſibly, that an Equality of Weight may
preſerved in an Animal, which Equality
ept up unequally. But in this Inter-
tion of Secretions, if we are ſuppoſed
etain the Half of ſix Pound in one Day,
it is evident that this augmented Quan-
is had in little more Time than three
s, and conſequently the Weakneſs is
duced in ſo ſmall a Time. If the re-
ite Quantity was ſuppoſed to be made
wo or three Ounces at a Time, and that
ntity was equally retain'd, and not
ed, then it is certain the Production
ld not be ſo quick and ſudden, tho' this
ct of Weakneſs may ſtill be ſo, becauſe
don't become ſenſible of the Effect, till
in that Quantity ſufficient to produce
Weakneſs this Way; and therefore we
me ſenſible of the Weakneſs, only after
whole Quantity is accumulated, and that
by the laſt added Quantity, the three
ces, or ſome Part of it, 'tis by the Quan-
added in ſome Part of the laſt Day of
th we are ſenſible of its Effect, and feel
ſelves weak: So that this Weakneſs
s to be the Production of one Day, or
ſudden. It is eaſy in both the men-
ed Caſes to make a Computation of the
ned Steams in different Suppoſitions,
t is not impoſſible to determine actually
in a very little the real Performances of
tions in Animals reſpectively, or of the
Animal at different Times.

The Heat of the Body is proportionable to the Quantity of hot Parts in the Blood, or to its Velocity, *cæteris paribus*; and the Quantity of theſe Parts are commonly as the Quantity of Blood: Now the Quantity of Blood being greater, the hot Parts affect the ſenſible Parts leſs with their Heat, even as if they were in a ſmaller Quantity. 'Tis certain that this leſs Affection of Heat does proceed only from theſe hot Parts being confin'd, ſo that they cannot act, and there being a Lentor in the Blood at this Time, it is this Lentor that thus confines them, or it is the Lentor that occaſions this univerſal Coldneſs, by locking up the hot Parts of the Blood.

But in any State or Condition of the Blood whatever, the Fluidity of the Blood is greateſt as it goes out of the Heart into the *Aorta*; and is likewiſe the groſſeſt as it returns by the *Cava* into the Heart: And this its Fluidity decreaſing orderly, as it removes from the Heart, in the remoter Arteries, the Lentor increaſes there in the like Manner, and the Velocity is leſs in Proportion as is the Sum of the Diameters of the Ramifications of Arteries to their Trunks. Thus in thoſe extreme Parts the Heat becomes leſs.

On the other Hand, the Blood convey'd into the Brain being carried in Veſſels that have fewer Ramifications than like Veſſels of the ſame Length, and theſe Ramifications running out to no great Length in the Brain before they diſcharge their Liquor into wide and numerous *Sinus's*, 'tis for theſe Reaſons that the Velocity of the Blood with *Lentor* is more preſerved in its Circulation through the Brain than in other Places of the ſame Diſtance from the Heart, and the Heat of the Blood being proportionable to its Velocity, it is greater in the Brain than in any other remote Part.

The Blood being thus augmented in Quantity and Viſcidity, it muſt fill in a ſuitable Manner theſe Arteries thro' which it flows, and the Coats of theſe Arteries being much ſtretch'd, have their compounding Parts more disjoin'd from one another, which Disjoining is a Solution of Unity or Pain: Though from this hinted Cauſe of Pain it is manifeſt, that the Bones can never occaſion a feeling of Pain; yet it is as evident, that the

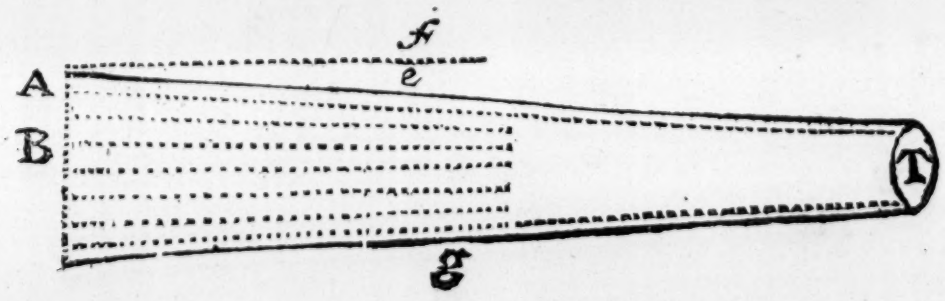
the *Perioſtium* which ſo cloſely inveſts them is capable of producing any Sort of Pain, and becauſe of this their Contiguity, and the Thinneſs of this Membrane, the Affections of the one cannot be diſtinguiſh'd from the other, if both could be affected in the ſame Manner. This is the Cauſe, when the *Perioſtium* is affected with any Sort of Pain, we complain of a Pain in the Bones, that are better and more univerſally known to thoſe that feel Pain than the *Perioſtium* it ſelf.

From hence the Blood is leſs capable to ſeparate its fine and ſubtile Parts, and there being a leſs Quantity of them, the Contraction of the Muſcles is ſo much the weaker, and the Blood will be ſqueez'd out of the Heart with the leſs Velocity, which cauſes the Arteries to be more ſlowly diſtended, ſo that the Pulſation is weaker than it ought to be.

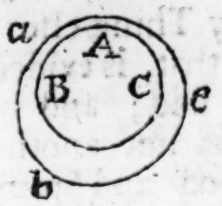
The ſame is the Reaſon why the Beating of the Pulſe becomes rare, for the Motion of the Heart and Arteries are Synchronical, and from the ſame Cauſes proceeds what we call a depreſs'd Pulſe.

The Doctor ſays, the Pulſe is made by a greater Quantity of Blood impell'd from the wider Part of an Artery into its next narrower Station, and that every Time the Heart is contracted, and in the Time of its Dilatation, the Blood thus impell'd by the preceding Syſtole, has its Motion continued by the reſtitutive Power of the Artery; *viz.* the elaſtical Force of its membranous Coats, and the Contraction of the muſcular one. Theſe Powers are ſo great, that they are able to bring the inner Surfaces of theſe Veſſels to be contiguous when Blood is not impell'd for ſome Time, and would always do it but for the circulating Blood; and therefore when at any Time there is a greater Quantity of Blood, and that more hardly propell'd becauſe of its Lentor, the Arteries being fuller, are more hardly reſtored.

The Doctor ſays, he muſt be fuller in explaining this, becauſe a Phyſician who attack'd the Doctrine of *Harvey*'s Circulation, pretended likewiſe to find an Impoſſibility in this Way of explaining Pulſes; but his Miſtake proceeded from his underſtanding neither of theſe Doctrines. Our Author, to illuſtrate what he has ſaid, (tho' he cannot here ſufficiently clear it, but reſerves it to its own Place) ſuppoſes *A T* to be an Artery in its natural Poſition, fill'd with Blood flowing from *B*, *A e* one Side, and *A g* the other; and the prick'd Line *A f* the Side *A e*, when fill'd at every Contraction, and diſtended to *f*, where the Finger is ſuppoſed to be. After the ſame Manner, *A g* tending outward as freely as *A e*, then *A g* oppoſite to *A e*, will make an *Excurſus* equal to *A e*; but when *A g* runs over a Bone, as in Places where the Pulſe is eaſieſt felt, or near it, ſo that it cannot ſo freely be diſtended by the impell'd Blood, in that Caſe the Diſtention of *A g* will be added to the Diſtention of *A e*, or thereabouts, and the Diſtention of *A e* will be double of what it otherwiſe would be. This is manifeſt, and is evidently the Cauſe of Pulſes, and their being ſo ſenſible. But it has been ſaid, that in Time of the Diaſtole the Side *A e* returns from *f* to its natural Poſture, and that by the mentioned Powers. Now whether *A f*, or 2 *A f*, don't return to *A e* becauſe of the Reſiſtance and Lentor of the Blood, but only half Way, *viz.* from 2 *A f* to *A f*; in that Caſe, *A f* coming out againſt our Finger cannot ſtrike our Finger ſo ſtrong, the *Tranſcurſus* in the ſame Time being but half the Length, and therefore the Pulſe is depreſs'd, as we have ſaid; but if the Return is very little, *viz.* $\frac{1}{4}$ or $\frac{1}{6}$ of *A f*, then the Diſtention at next Contraction of the Heart is very inconſiderable.

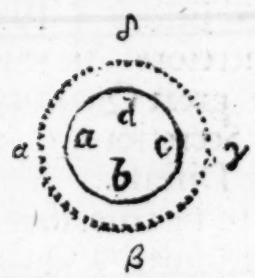


But this laſt Conſideration will more par-
cularly appear, if we ſuppoſe *A B C* the



anſverſe Section of an Artery when it is
its natural Poſition, but by a *Plethora* be-
me larger; the Artery being diſtended,
e Section fills the Place *a b c*. If the
eadth of the Ring be but $\frac{2}{10}$ of the Dia-
eter of the Artery, there will be very near
much Blood contain'd within the Ring,
there can be in the whole Circle *A B C*.
ow the Diameters of theſe Arteries, where
e commonly feel the Pulſe beat, are not
ove $\frac{1}{6}$ of an Inch, and conſequently the
eadth of the Ring will not be above the
o hundredth Part of an Inch, which is ſo
all a Quantity as cannot be eaſily per-
ved by Sight or Touch.

Suppoſe now the Circle *a b c d* to be the
ction of the Artery thus diſtended, and



cauſe the Heart conſiſts of very ſtrong
uſcles, the Capacity of the Heart cannot
much increas'd, and therefore at every
ulſation there will not be a much greater
uantity of Blood diſcharged into the Ar-
ies than before the *Plethora*. 'Tis known,
at the Coat *a b c d* will be further exten-
d at every Pulſation about one hundredth
rt of an Inch, *viz.* to *α β γ δ*, ſo as to
ceive a Quantity of Blood equal to what
e Artery receives when 'tis in its natural
ate; or, which is the ſame Thing, the
eadth of that Ring between the two Cir-
es *a b c d*, and *α β γ δ*, which is equal to
e above Circle *A B C*, will not be found
exceed the hundredth Part of an Inch.
ppoſing then that, in an ordinary State of
ealth, all the Blood at every Pulſation

were forced out at the Artery, and that the Coats came together, yet in this State of a *Plethora* the Artery will not riſe againſt your Finger above the hundreth Part of an Inch, which is indiſcernible.

This Squeezing of Blood through the Canal is imagin'd to proceed from the ſtraitning of its Cavity, and by ſomething that compreſſes it, and therefore this Pulſe is ſaid to be compreſs'd, but this is impoſſible, tho' the Feeling is juſt, and the Quantity of Blood is too great for the Cavity of the Veſſel, eſpecially to produce a natural Pulſe; nay there may be no Pulſe, or no ſenſible one, according to the Fulneſs.

The Arteries are thus diſtended by a Quantity of Blood and Lentor, and the Pulſe depreſs'd; but their Diſtention being proportionably greater, as the Reſiſtance the Sides of theſe Arteries meet with in their tending outward is leſs, it is manifeſt that their greateſt Freedom to be diſtended is in the Brain, becauſe of its Softneſs, which is compreſs'd in that Manner, and to that Degree almoſt, that the Blood Veſſels are diſtended; and becauſe of its being thus compreſs'd, the Secretion and Derivation of Animal Spirits is impeded by the Compreſſion, which is ſtill not ſo laſting, becauſe of the Reſtitution. Yet becauſe of this Affection we are ſleepy, and therefore in the Time of this Quantity and Lentor there is Sleepineſs, as is manifeſt from the Cauſe and Effects of Sleep.

Theſe Symptoms, ſays the Doctor, may in general be continued as long as this Lentor it ſelf, and that according to its Quantity and Degrees of Cohæſion, it being in Conſideration of them that it is more eaſily or hardly diſſolv'd. He adds, that ſince he found by Experience, while he was at Sea, that theſe Symptoms began to go off in a Day or two, or that the Heat did ſenſibly return in that Time; he concludes, that the Nature of this Lentor might be diſſolved in ſome Meaſure in that Space, and that this is done by the Blood's becoming warm, and being delivered from its confining viſcid Parts, which is ſooneſt felt neareſt the Heart.

The Heat thus proceeding, the Blood becomes more fluid, and the Pulſe great and ſtrong, and hence proceeds Reſtleſneſs and Drought, the Roughneſs and Blackneſs of

the Tongue, the Difficulty of Breathing, the Heat of the Breath, *Deliriums*, and Want of Sleep.

He comes next to the going off of this Sickneſs; and firſt tells us, that this Diſtemper proceeding from a greater Quantity of Blood, goes only off by the Diſcharge of that Quantity.

Therefore it is no Wonder that ſenſible Evacuations are produced in the End of this Diſeaſe, or put an End to it: But if the Lentor, in the firſt Caſe, be not diſſolved, and remains the ſame, the Quantity of Blood may be increas'd till all the Veſſels of the whole Body be fill'd with as much Liquor as if they had been forcibly injected with a Syringe, in which Caſe the Blood cannot move. But, 2. This Lentor will increaſe, and hinder the Animal Spirits to be ſeparated and derived, and by theſe the Contraction of the Heart and Motion of the Blood deſtroy'd, ſo as the Patient dies. 3. If ſome Secretions continue the ſame, or are increas'd, and the Lentor not diſſolved, the Quantity of Fluid Blood will be leſſen'd ſo much, that from the remaining thick Blood there cannot be a ſufficient Separation of Spirits to propel the Blood, the Conſequence of which muſt be Death. On the other Hand, the Quantity of Blood thus augmented may be increas'd by the Diſſolution in ſuch a Manner, that the Arteries of the Brain being too long kept in a Stretch, the Beginnings of the Nerves are ſo compreſs'd by them, that no Spirits can be impell'd, neither any derived, or not in a ſufficient Quantity for the Contraction of the Heart, which will be follow'd by Death.

The Doctor having thus demonſtrated the Neceſſity of theſe Symptoms from a ſuppoſed Interruption in Tranſpiration, he proceeds to vindicate this Theory from being meerly an Hypotheſis, and ſays, That if we take one or more of the mentioned Symptoms, and read them backward, according to the known and familiar Rules of Nature, without having Regard to any Hypotheſis, we ſhall find them proceeding from ſuch a Fulneſs as has been inſiſted on; and if that is true, the Suppoſition ſo far was properly made, and every Thing true we have deduc'd from it. In Confirmation of this, he takes the firſt Symptom that offers it ſelf to his Explication, and finds it entirely owing to this Fulneſs of Blood. Our growing ſuddenly weak, ſays he, makes it manifeſt, that it proceeds from this Fulneſs of Blood exclusive of every Thing elſe. How it may be occaſioned by that, is evident from what has been already ſaid; and beſides this Way, ſays he, there is not another, but by a real Want of Blood and Spirits, through ſome natural Evacuation augmented, or a preternatural one made. But neither of theſe happen while we have a Fever form'd, and therefore the aſſign'd one is the Cauſe. He refers to *Sanctorius*'s Statical Medicine for the Proof of this; where it appears, that the Diſcharge by Tranſpiration is not only greater than any one of the reſt, but that it is double to all of them; nay, that in ſome People it is 15 Times greater than their Evacuation by Stool; therefore, when it is interrupted, it is capable of producing that Fulneſs in half the Time that all the other Secretions together can do it.

The Doctor ſays, 'tis no Contradiction nor Impoſſibility for this Lentor to be collected by Degrees, and to lie in the Blood till 'tis ſufficient to make a Paroxyſm, that it muſt circulate through the Body ſeveral hundred Times before a Paroxyſm can be produc'd: Therefore 'tis more apt to be waſted in the great Quantity of Tranſpiration and other Secretions, than to lie ſo long as to make any Diſeaſe.

He owns it to be true, that 'tis hard to apprehend how ſo ſmall a Quantity of Matter as this is ſuppoſed to be, ſhould be mix'd with 20 Pound of Blood, and either not aſſimilated to its Nature, or caſt out with its Parts, that are plentifully then diſcharged in ſundry Places. But ſo long as we know it to be Matter of Fact that happens in many other Caſes, it is poſſible in this, which is all he alledges. He inſtances for Proof of it, Aſparagus, Onions, Caſſia, Rhubarb, Turpentine, *&c.* whoſe Smell, Colour, and other of their ſenſible Qualities, we know are preſerved in the Blood more Days than one, by their being diſcharged in that Time in Urine, Milk, *&c.* for this is a certain Argument that there's ſomething of theſe Bodies carried into the Breaſts and Kidneys, without loſing of its Nature, tho' it has been often carried through the Lungs and all the Body

dy; and it may be very probable, that is vitiid Stuff may be very often carried und the Body without any conſiderable teration. The Biting of a Mad Dog is a oſt extraordinary Example, which ſhews w the whole Maſs of Blood may be nted and corrupted by an inſenſible Quan- y of Liquors, which produce no manifeſt ect till after many thouſand Circulations, the Space of 30 or 40 Days; ſo that be- e its appearing, it has circulated ſome ouſand Times through the Lungs without ffering any Diminution of its Strength; y, in that Time has altered the whole Maſs Blood, and changed it into its Nature.

He derives the Original of this Lentor m an Interruption of Tranſpiration, tho' may poſſibly be ſupplied from every Thing t yields us Nouriſhment, Paſſions, *&c.* t let it be generated in the Blood without y Subſtance added to it, as it may be by ſſions, *&c.* or let it be ſuppoſed that ſome ange Matter was brought into it by the yle from the *Viſcera*, *&c.* all or any of m able to form this Lentor; 'tis certain, Condition being ſuch, theſe Paroxyſms, th their orderly or diſorderly Returns, ll follow.

He comes in the laſt Place to give an Ac- unt how it ſometimes ends in Death at the turn of a Fit. He ſays, if there be ſo at a Quantity of Lentor mix'd with the od that it can't be driven out of the ſmall teries into the Veins; or tho' the Quan- be leſs, yet if its Adheſion to the Veſ- s be ſtronger than can be broken off from Sides of thoſe Veſſels, or cannot be dri- n along in them, in that Caſe the Blood ſt ſtop, and in a little Time the Body ll be cold, there will be no Blood derived o the Muſcles, it either arrives not to the in, or totally ſtagnates there, which is ath. But all this happening at the In- ion of the Coldneſs, and that becauſe the ntor which occaſions it cannot be diſſolv'd, evident that at this Time, or in the Re- n, they always die.

He ſays, it is likewiſe evident from what been ſaid, that a thorough Recovery, her naturally happening, or brought ut by Medicines, is by a thorough Diſ- ution of this Lentor, the correcting the *cera* that ſupply it, and a total Excluſion of it out of the Blood; and by this no Re- turns happen as formerly.

He adds, that the different Appearances of thoſe Diſeaſes are various, according to the Seamens moderate or immoderate Uſe of ſtrong Liquors, and that the temperate Uſe of Liquors more ſpirituous than Small Beer, ſeems ſometimes neceſſary to give the requiſite Force to protrude their groſs Chyle, and to convert it into Blood proper for Circulation in every Part of the Body, and that this is a ready Way to preſerve them from the Dropſy, Jaundice, and Hypochondriac Melancholy. But he obſerves, that by their ill Husbandry and Intemperance they are frequently ſo drunk, that they are not able to crawl into their Hammocks, but ſleep upon the cold Deck, and contract thoſe Sickneſſes occaſioned by Want of Perſpiration; only their Blood being full of the Spirits of the Liquor, they don't lie ſo long under the Coldneſs that begins all Fevers as in thoſe which proceed from other Cauſes.

He comes next to conſider the Difference between theſe Diſeaſes thus related, and theſe or others that happen in hotter Countries. He ſays, that the Lodging, Victualling, and Way of Living, being the ſame in both Places, theſe different Effects are altogether owing to the Air in which they live, as it may concur with other Cauſes in producing theſe Diſeaſes. There's a great Difference betwixt hot and cold Air, in Heat and Weight by diſcovering how Air of ſuch Qualities concur with the other Cauſes he found the Progreſs of their Diſeaſes with and without Medicines, as is ſaid; and he is convinc'd this Matter admits of ſuch a Certainty, as Surgeons of an indifferent Education might be capable to practiſe in thoſe Fevers in the *E.* and *W. Indies*, with as great Succeſs as Phyſicians in *England* and other temperate Countries.

Here he gives us an Account why he has neglected the common Stories of Poiſon, the Chymical Principles, and of Acid and Alkali.

1. As to Poiſon, which ſome aſſert to be in the Spirits, and produces theſe Fevers, he ſays, it is not explain'd by its Patrons, and is very unintelligible, nor have they preſcrib'd any Counter-poiſon for a Cure. He adds, there can be nothing found in the moſt

malignant Fevers that can really diſtinguiſh them from any other continued Fevers, and that all the Difference which can be alledg'd, may be naturally accounted for by a greater or leſſer Quantity of this Lentor, its greater or leſſer Coheſion, and its different Solution. But what he ſays is moſt ſurprizing to him is, that in a Family of 10 or 12 People, thoſe of the beſt Blood, and ſtrongeſt Habit of Body, do ſooneſt catch it, and run the greateſt Risk. He ſays, 'tis evident that malignant Fevers proceed from the ſame Lentor that cauſes others from this; that moſt of thoſe malignant Fevers ſucceed Quotidians and Tertians, in which there are greater Quantities of Heat and Humidity that diſſolve this Lentor, tho' they come not ſo frequently after Quartans, in which the Viſcidity is greater, and the warm Parts more confin'd.

2. As to the Chymical Principles, they are ſo far from being ſimple, and having the requiſite Properties of Simples, as one of the moſt learned Chymiſts has demonſtrated, that 'tis ſtrange any ſhould adviſe us to aſſume Propoſitions ſo unknown, in order to the explaining of Sciences that have ſo uſeful and neceſſary a Practice. The Chymiſts, he ſays, tell us, that a Fever is nothing but too great a Quantity of Sulphur in the Blood, or that too much exalted. He inquires into its Power of doing this, and producing that Effect. In order to make this Enquiry with more Exactneſs, he ſuppoſes with all Philoſophers, that if any Thing can be alledg'd as a Cauſe, and the Effect always follows, without the Help of any Thing elſe, we may undoubtedly aſſert that to be the productive Cauſe of this Effect; and on the contrary, if the pretended Cauſe be there, and the Effect follows next, or if that which is ſaid to be the Effect be preſent without the Cauſe, then that Cauſe never produces that Effect. Therefore ſince adding of ſulphureous Medicines to the Blood, will not only heighten the Power of the Sulphur in the Blood, but produce more, 'tis plain that upon this Addition we muſt always have a Fever: Yet, after drinking ſalt and ſulphureous Bath Waters, which are mix'd with the Blood, and diſpers'd all over the Body, we find no ſuch Feveriſh Fits. He adds, that in the Suppreſſion of Urine by the Stone, the ſharp and pungent ammonical Salts of the Urine ſhould infect the Maſs of the Blood and produce thoſe ſeveriſh Effects, which neverthleſs are ſeldom obſerv'd to happen, and may then be more properly produc'd by other Cauſes. Beſides, we know that when a Dram or two of Oil of Sulphur is immediately poured into the Blood of a live Dog by his Blood Veſſels, and the Veſſels bound up, the Dog, tho' he makes ſome little Moan, yet, as ſoon as 'tis ſet at Liberty, is free from any Fever, ſkips about full of Health, and eats whatever Food comes in his Way. Therefore the Doctor concludes, that an Alteration made in the Blood by ſalt and ſulphureous Juices and Spirits is not the productive Cauſe of a Fever.

He has omitted Acids and Alkali's, becauſe they who ſet up for it have not told us what it is, when they tell us that an Acid is that which can ferment with an Alkali; and we know that ſome Medicines, both ſimple and compounded, ferment with ſuch as are declared Acids, and then with others that are determined to be Alkali's. For what he ſays further on this Subject, we refer to the Book it ſelf.

The Second Part of this Treatiſe conſiſts of Hiſtorical Obſervations of the Sickneſſes in the Fleet, which he made by himſelf, or had from others, to which he has added the Way of curing them. The Obſervations are 30, for which we refer to the Book it ſelf, and come to the Doctor's Eſſay on Bleeding, which is the laſt Part of his Treatiſe, wherein he gives an Account of the Quantities of Blood to be let in Fevers in any of their Periods.

He ſays, we muſt conſider the various Methods that are taken to help the Practice of Bleeding, and firſt puts us in Mind, that Bleeding claims the chief Conſideration, among other Evacuations that are neceſſary for the Cure of Fevers: For they being neceſſary, this is the moſt compleat and ſimple Evacuation, by which we have the Quantity we demand with the greateſt Certainty, without inducing Parts of unaccountable Operations to be mix'd with the Blood. This Evacuation, ſays he, beſt deſerves our ſerious Conſideration, notwithſtanding the Difficulties which attend it; and they that are againſt

gainſt it as too dangerous, ſhould likewiſe iſcontinue all other Evacuations and Methods of Practice, ſince they are preſs'd with he ſame and greater Difficulties. The Uncertainty and Danger of Sweating Medicines, of provoking Urine, the doubtful Adminiſtration of Purgatives, or even of lenient urges, and the precarious Uſe of acid and lkali Medicines, are enough to throw us nto ſuch Deſpair, as rather to leave our Patients to the Strength of Nature, than that hey ſhould periſh by raſh Attempts intended for their Safety.

In the next Place, the Doctor conſiders the rdinary Rules for Bleeding, which are, . That Blood may be let in any Quantity, ill the ſick Perſon faints away. 2. Till the Colour of the Blood change from worſe to etter, from being black till 'tis red. 3. Till e take away enough. 4. To take ſuch a Quantity, that the Strength of the ſick Perſon be not impaired. Laſtly, Till the Fulneſs of the Veſſels is depleted.

As to the Firſt, he ſays, it has very little Regard to Diſeaſes, for we bleed often in Fevers to increaſe the Velocity of the Blood, which cannot be performed by this Rule. 2. By Revulſion and Derivation, the Velocity of the Blood is more increas'd in one Part than in many others, eſpecially in Time of Bleeding. But theſe partial Velocities of the Blood may be cauſed without this Rule, nay, could not be if it was obſerved: Therefore this Rule, far from directing us, would hinder many good Effects commonly obtained by Bleading. Laſtly, this Rule is perfectly uſeleſs, for ſome People faint at the firſt Sight of their Blood, or at the very Launcet, while others can bear the greateſt Part to be let out before they faint.

The 2d Rule he owns to be more diſtinct, yet he ſays, if we are only to bleed when the Colour of the Blood is degenerated from its Redneſs, we ſhould omit Bleeding in many Caſes wherein Experience has ſhewn it to be uſeful. For Inſtance, Bleeding is a ſudden and great Relief in Apoplexies, in Mania's, in Melancholy, and often in continual Fevers, tho' the Blood in theſe Diſeaſes is frequently redder than at other Times. Beſides, according to this Rule, a Man whoſe Blood is of a Colour, ought not to be let Blood in caſe of a Fall, by which Neglect he might fall into Rheumatical and Pleuritical Pains, Fevers, Impoſthumes, Apopheſies, *&c.* The Doctor adds, that if we are only to bleed when the Blood is diſcolour'd, and till ſuch Time as it acquires its natural Colour, 'tis certain that in moſt Caſes we might drein the Body of all the Blood ſooner than compaſs this Deſign. For beſides what we may obſerve in the Experience of Bleeding, 'tis not unreaſonable to believe, that the Blood does not much differ in Degrees of Illneſs in every Part of the Body, and then the Rule will be dangerous.

The 3d Rule is ſo very uncertain, that 'tis a Wonder how it ever came to be thought on; for it wants another Rule to direct us when we have taken enough.

The 4th is more particular, but as difficult to be diſcovered as any of the reſt. But for the better underſtanding it, he refers to the great *Italian* Phyſician *Laurentius Bellini.*

The laſt Rule is taken from the Largeneſs of ſome Mens Veſſels more than others, or of this Largeneſs in a Man at one Time more than at another; and they think that this extraordinary Quantity may be diſcharged, which is known to be done when the Veſſels have acquir'd their former Size. But this Rule labours under all the Difficulties to be met with in the former, beſides others that are peculiar to it ſelf; for it is evident, that they who have the largeſt Blood Veſſels have the leaſt Blood; and are the leaſt able to bear its Evacuations. Beſides, the Quantity of Blood may be augmented by Bleeding, of which the Doctor gives ſeveral Inſtances. He ſays, that to know the Times of Bleeding is a Matter of great Importance, and refers to *Bellini*, as the only Phyſician who has writ tolerably on this Subject.

An

An Explanation of the *FIGURES.*

Of the Veſſels of Generation, or Genital Parts, of Men. Taken from Reynerus de Graef, *Phyſician at* Delph.

TAB. I.

Fig. I. *Of the Veſſels called* Preparantia *and* Deferentia *of the Teſticles.*

A. The Artery preparing the Seed, running out naturally from the Trunk of the Artery towards the Teſticle.

B, B. A Ramification of the preparing Artery, forwarding the Seed towards the Teſticle, very rarely obſerved by us in this Subject.

C. The common Divarication of the Artery preparing the Seed into two Branches.

D, D. A leſſer Branch of the Artery preparing the Seed which runs to the *Epididymidæ.*

E, E. The larger Branch of the preparing Artery, which is inſerted into the upper Part of the Teſticle, and by its Back deſcends towards the lower Part, to which is join'd a leſſer Ball of the *Epididymidæ*, and returns again through the Belly of the Teſticle, where it is divided into ſeveral Branches.

F. A larger Ball of the *Epididymidæ*, firmly adhering to the upper Part of the Teſticle.

G. The middle Part of the *Epididymidæ* inverted, that the Ramifications of the Artery running through the inferior Part thereof may appear.

H. The leſſer Ball of the *Epididymidæ*, firmly knit to the inferior Part of the Teſticle.

I. The End of the *Epididymidæ*, or the Beginning of the *Vaſa Deferentia.*

K. The *Vas Deferens*, cut off before it comes to the hinder Part of the Urinary Bladder.

L. The Teſticle, ſo placed that its Veſſels may the better appear.

Fig. II.

A. The preparing Vein, from the deſcending Trunk of the *Vena Cava*, running to the very Teſticle.

B, B. Branches of the preparing Vein, tending towards the Caul and *Peritonæum.*

C. The firſt Diviſion of the preparing Vein into two Branches, which are afterwards ſubdivided in a different Manner, and joined again.

D, D, D, D. The Valves of the preparing Veins, about which the Veins, while they are blown up, appear knotty.

E, E, E, E. The Diviſions of the preparing Veins, and ſeveral Unions, whereby the ſuperfluous Blood from the Generation of the Seed contain'd in one Ramification may return to the Heart by another.

F, F. The upper Part of the Teſticle, by which the Ramifications of the preparing Vein may be implanted in the Back.

G, G. The Ramifications of the preparing Veins creeping by the Sides of the Teſticles, by the *Tunica abbuginea.*

H. The Body of the Teſticle.

I. The larger Ball of the *Epididymidæ*, firmly adhering to the upper Part of the Teſticle.

The middle Part of the *Epididymidæ*, slightly sticking to the Testicle.

L. The lesser Ball of the *Epididymidæ*, firmly knit to the inferior Part of the Testicle.

M. The *Vas Deferens*, cut almost off in the Middle.

Fig. III.

A. A Part of the *Vas Deferens*, in which the Cavity is conspicuous.

B. The serpentine Windings about the End of the *Epididymidæ*, from the loosen'd Part.

C. The last Solution of the *Epididymidæ*.

D. The serpentine Foldings about the Middle of the *Epididymidæ* unlooseu'd.

E. The last unfolding of that Part.

F. Another Part about the Middle of the *Epididymidæ* from the loosen'd Part.

G. The last Solution of the same Part, by which Means the whole Body of the *Epididymidæ* appears to be as one continued Vessel, that by Degrees touches the upper Part of the Testicle.

H. The larger Ball, or the Beginning of the *Epididymidæ*, so that its Vessel is divided into several Branches.

I. The Belly of the Testicle.

K. The preparing Artery, which ascends from the inferior Part of the Testicle, by its Belly.

L, L. The Ramifications of the preparing Veins.

TAB. II.

Shows the Humane Testicles, with their proper Coverings and Vessels.

Fig. I.

A. Part of the preparing Vessels cut off.

B. The *Tunica Vaginalis*, containing in it self all the Vessels of the Testicles.

C. The Beginning of the *Cremaster* Muscle.

D. The carnous Fibres of the *Cremaster* Muscle, which are joined to the *Tunica Vaginalis*, and run through it lengthways.

E. E. The carnous Fibres of the *Cremaster* Muscle, terminating obscurely in the *Tunica Vaginalis*.

F. The *Tunica Vaginalis* containing the Testicles.

Fig. II.

A. The preparing Vessels, transversly cut.

B. The Vessels of the Testicles, freed from the *Tunica Vaginalis*, and by certain fine Membranes, slightly united one among another.

C. The preparing Artery ascending thro' the Belly of the Testicle.

D, *D.* The Branchings of the preparing Veins running on the Sides of the Testicles.

E. The *Tunica abbugtnea*, containing on every Side the Substance of the Testicle.

F. The retracted Part of the *Tunica Vaginalis*.

G. The larger Globe or Ball of the *Epididymidæ*.

H. The middle Part thereof.

I. The lesser Ball.

K. The End of the *Epididymidæ*, or Beginning of the *Vas Deferens*.

L. The *Vas Deferens* cut off.

Fig. III.

Fig. III.

A. The preparing Artery, as commonly found in Humane Bodies.
B. The Diviſion of the preparing Artery into two Branches.
C, C. The larger Branch of the preparing Artery running to the Teſticle.
D, D. The leſſer Branch, making its Way towards the *Epididymidæ.*
E. The greater Ball of the *Epididymidæ* ſticking to the Teſticle.
F, F. The *Epididymis* inverted, from whence it may appear how the Artery runs under it.
G. The End of the *Epididymis.*
H. A Part or Portion of the *Vas Deferens.*

TAB. III.

Shows the Teſticles of Brute Animals, in which the Teſticular Veſſels may more eaſily and plainly be ſeen, as well from Art as Nature.

Fig. I.

A, A, A. The *Tunica Vaginalis* brought to the Sides.
B. The preparing Artery, which before came to the *Teſtes,* roll'd up from the Side breadthways, and back again.
C. The preparing Veſſels knit together by a certain thin Membrane.
D, D. The preparing Artery riſing upwards thro' the Belly of the Teſticle.
E. The Tracings of the preparing Vein.
F. The Canine Teſticle grown turgid with the Seed from the *Epididymis.*
G. The larger Globe of the *Epididymis.*
H. The leſſer Globe.
I. The Beginning of the *Vas Deferens.*
K. The *Vas Deferens* in a Dog tied before Coition.

Fig. II.

A. The preparing Veſſels cut off.
B. The preparing Veſſels in a leſs confuſed Order, as expreſs'd in the former Figure from the Engraver.
C. Branchings of the preparing Veſſels, tending to the *Epididymidæ.*
D, D. A large Branch of the preparing Artery running out thro' the Belly of the Teſticle.
E, E. Ramifications of the preparing Veins.
F. A Dog's Teſticle turgid with Seed.
G. The great Ball or Globe of the *Epididymis* turgid or ſwell'd with Seed.
H. The leſſer Ball likewiſe diſtended with the Abundance of Seed.
I. The End of the *Epididymidæ,* or Beginning of the *Vas Deferens.*
K. The *Vas Deferens,* likewiſe bound ſo that the Seminal Veſſels may more evidently appear fill'd with Seed.

Fig. III.

A. The large Ball of the *Epididymis* inverted, that the Divarications of the Duct of the *Epididymis*, and the Progreſſes thereof, may appear.

The ſuperior Part of the Teſticle, from whence the ſeminal Veſſels proceed the great Ball of the *Epididymis*.

C. The preparing Veſſels cut off.

D, D. The Divarications of the preparing Veſſels.

E. The Body of the Dog's Teſticle.

Fig. IV.

The Dog's Teſticle cut tranſverſly.

B, B. The ſeminal Veſſels, as they are plac'd amongſt the Membranes in certain Order.

C. The Root of the *Epididymis*. From *Highmore*.

Fig. V.

The Teſticle of a Mouſe, in which the ſeminal Veſſels ſo ſwell with Seed, without any previous Preparation, that they may be clearly and diſtinctly ſeen through the Albugineous Membrane.

The preparing Veſſels cut off.

The preparing Artery.

Ramifications of the preparing Vein.

The Proceedings or going out of the ſeminal Veſſels from the Teſticle.

F. The concave Part of the greater Ball of the *Epididymis*, lying naturally to the Teſticle now raiſed up.

G. The leſſer Ball, the firſt Diviſion whereof in this is turned as it were into a Round.

H. A Portion of the *Vas Deferens*.

I. Ramifications of the *Vaſa preparantia*, running to the *Epididymidæ*.

TAB. IV.

Shows the Humane Teſticles, diſſected ſeveral Ways, with the Glandulous Body.

Fig. I.

The Beginning of the *Epididymis*, or the Place in which the ſeminal Veſſels perforate the *Tunica albuginea* of the Teſticle, which the Engraver ought to have expreſs'd in a higher Place.

B, B. The great Ball of the *Epididymis* protracted, that the various Ramifications thereof may appear, the Manner of going out and coming into the Teſticles.

C. The *Vaſa preparantia* cut off.

D. Their Divarications creeping along the *Tunica albuginea*.

E. The *Tunica albuginea* of the Teſticles, tying the Teſticle cloſe on all Sides.

Fig. II.

A. The Body of the Teſticle, ſtripped naked from the *Tunica albuginea.*

B, B. The *Tunica albuginea* inverted, and protracted upwards.

C, C, C. Small Portions of the preparing Veſſels cut off, perforating the *Tunica albuginea.*

D. The *Tunica albuginea,* firmly adhering to the Back of the Teſticle, by reaſon of the Membranes of the Teſticle there intermix'd.

Fig. III.

A. The Subſtance of the Teſticle cleared from the *Tunica Albuginea.*

B, B, B. The freeing or opening of the Body of the Teſticle, whereby it appears that it is not glandulous, as it appears to be at firſt Sight, but compoſed of Veſſels.

C. A ſmall Portion of the *Tunica albuginea* ſtretch'd upwards.

Fig. IV.

A, A, A, A. The ſeminal Veſſels of the Teſticles placed amongſt the fine Membranes in due Order.

B, B. The ſeminal Veſſels running thro' the membranous Subſtance adhering to the Back of the Teſticle.

C. Small Parts or Portions of the ſeminal Veſſels cut off, that perforate the *Tunica albuginea* before the ſerpentine Duct, as ſeen in Fig. I. *B, B, B.* conſtituting the Great Globe of the *Epididymis.*

D, D, D, D. The *Tunica albuginea* in the fore Part of the Teſticle, and brought to the Sides.

Fig. V.

A. The Teſticle tranſverſly diſſected.

B, B, B. The Diſpoſitions of the ſeminal Veſſels.

C. The ſeminal Veſſels of the Membranes.

Fig. VI.

A, A. The glandulous Body divided in the fore Part.

B. The *Urethra* open'd in the upper Part.

C, C, C. The Ducts of the glandulous Body laid naked.

O. The Place of the Caruncle, by which the Seed flows from the *Teſtes* through the *Urethra.*

We have taken no Notice of any Figures of the *Penis* in this Place, becauſe you have 7 Figures of that Part at *P.* 72. of the Second Volume, and an Explanation of the ſame *P.* 137. Taken from *de Graef, Diemerbroek, Baulim, Tyſon, Cowper, &c.*

Tab. I.

Fig: I.

The Vessels call'd Præparantia & Deferentia of the Testides.

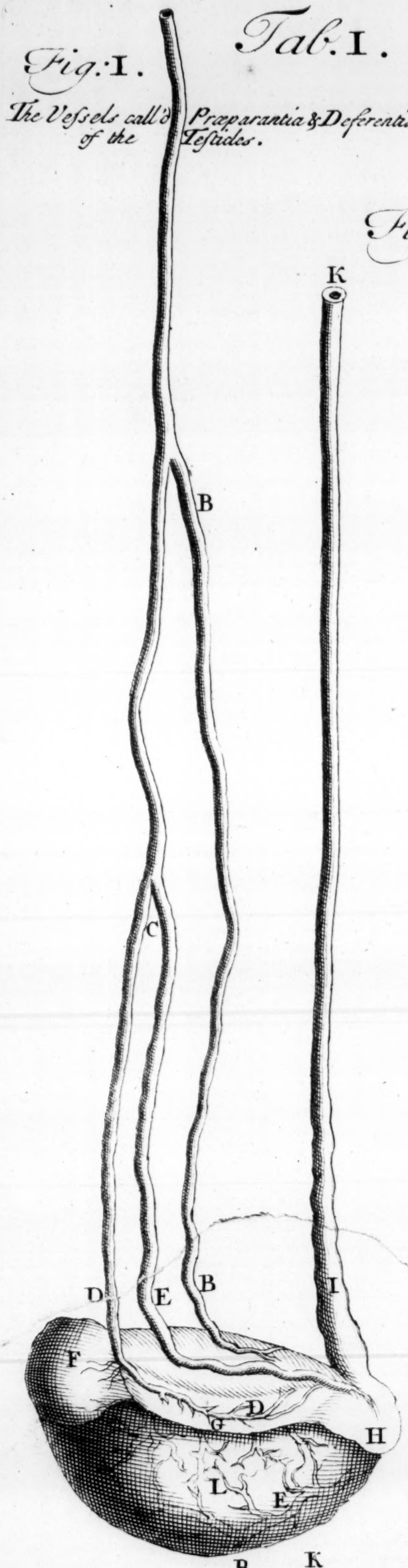


Fig: II.

The Veins & Vas Semen of ye Testicles.

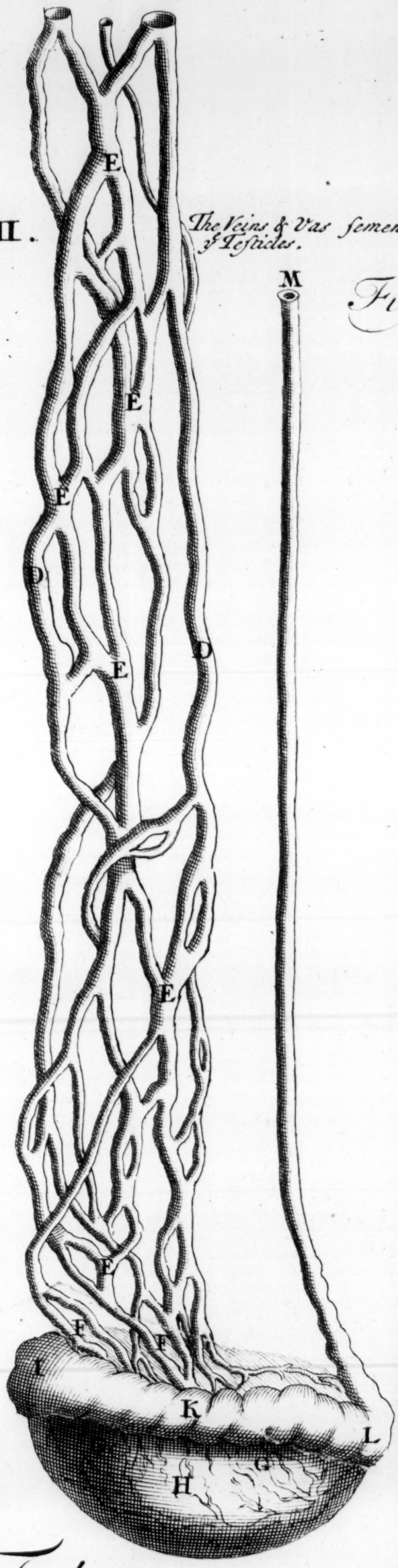
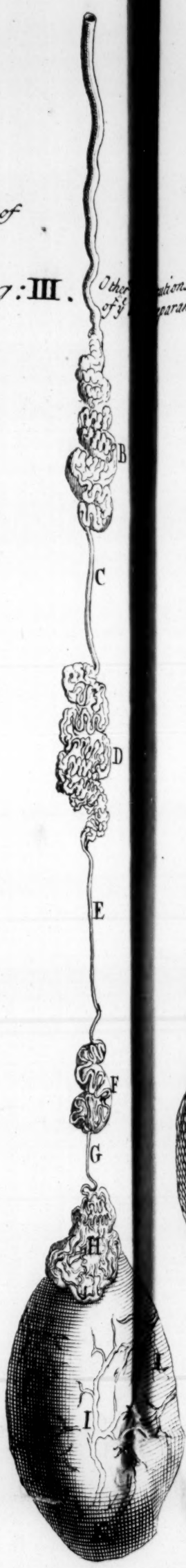


Fig: III.

Other ... of ye ...



Tab. III.

Fig: I.

The Testicle of Brutes in wch ye Vessels are plainly seen.

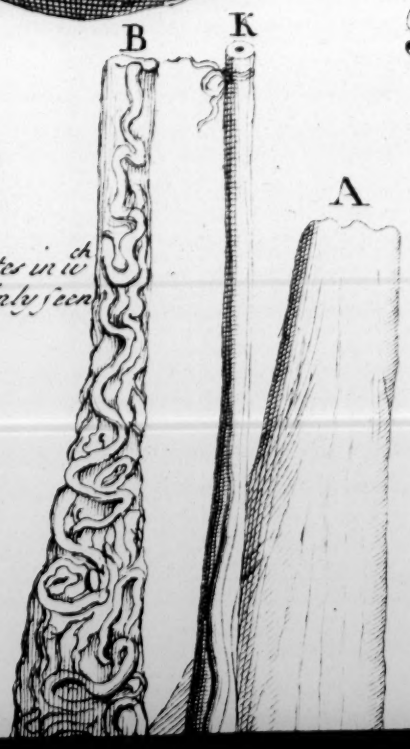


Fig. II.

The Testicle of a Dog full of Semen.

Fig

a Hum... several ... Glandules ...

Tab. II.

Vol 3 p. 310.

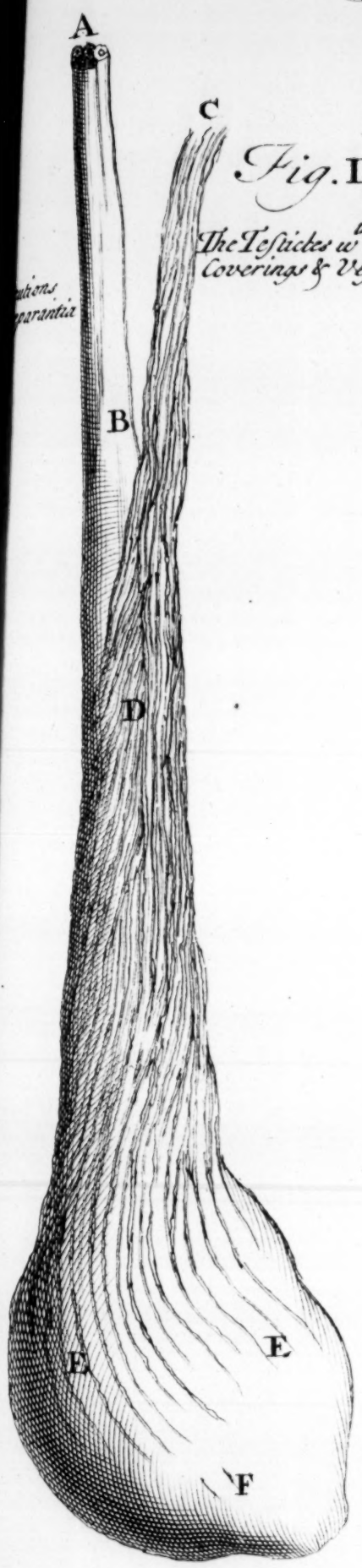


Fig. I.

The Testicles w^th their proper Coverings & Vessels.

Fig. II.

The preparing Vessels cut transversly &c.

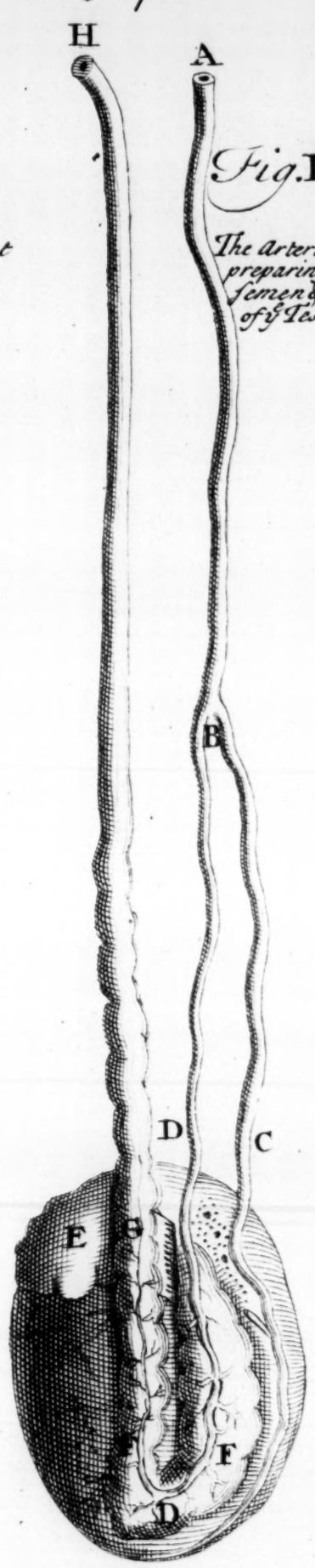


Fig. III

The Arteries preparing y^e Semen & Ball of y^e Testicle

Tab. IV.

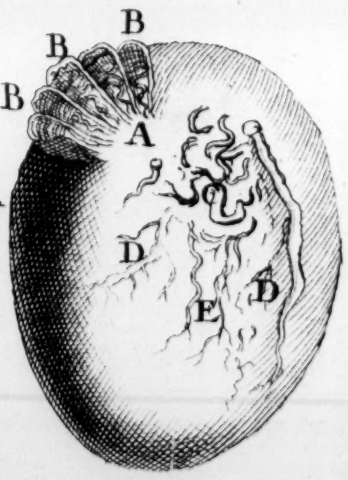
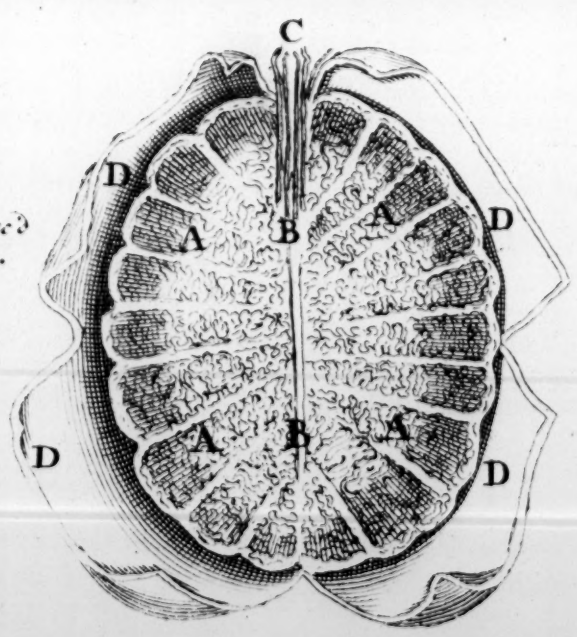


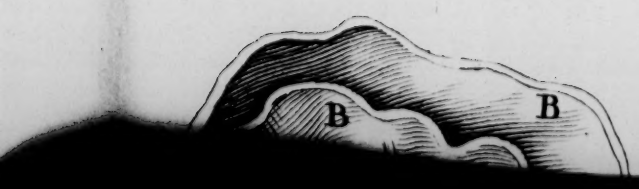
Fig. I.

...Testicle cut ...ll as of the ...is Body

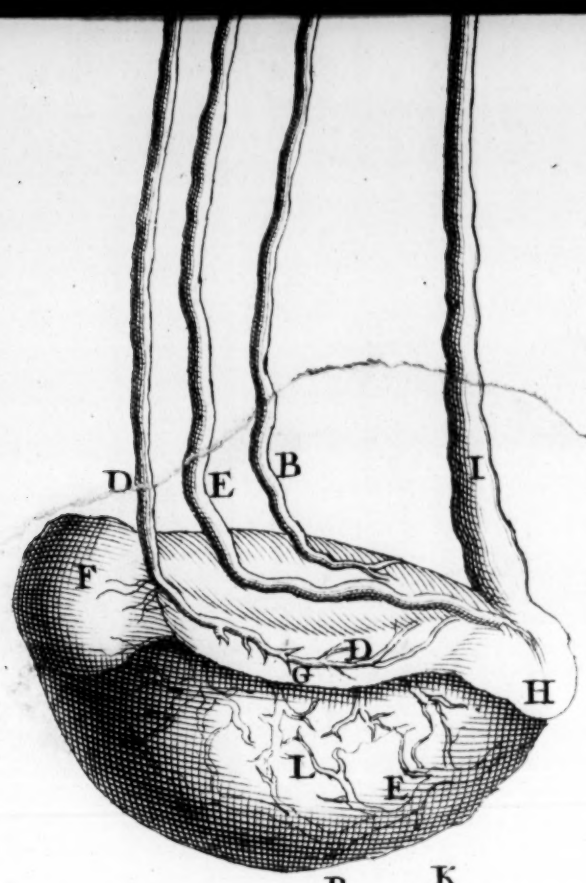
Fig. IV.

The Seminal Vessels plac'd among y^e small Membranes.





Tab. III.



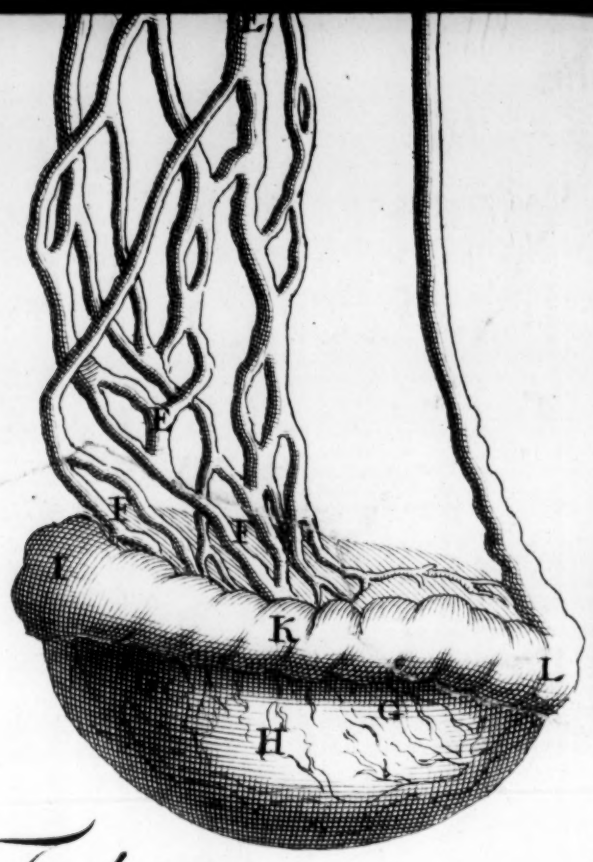


Fig. I.

The Testicle of Brutes in w^ch y^e Vessels are plainly seen

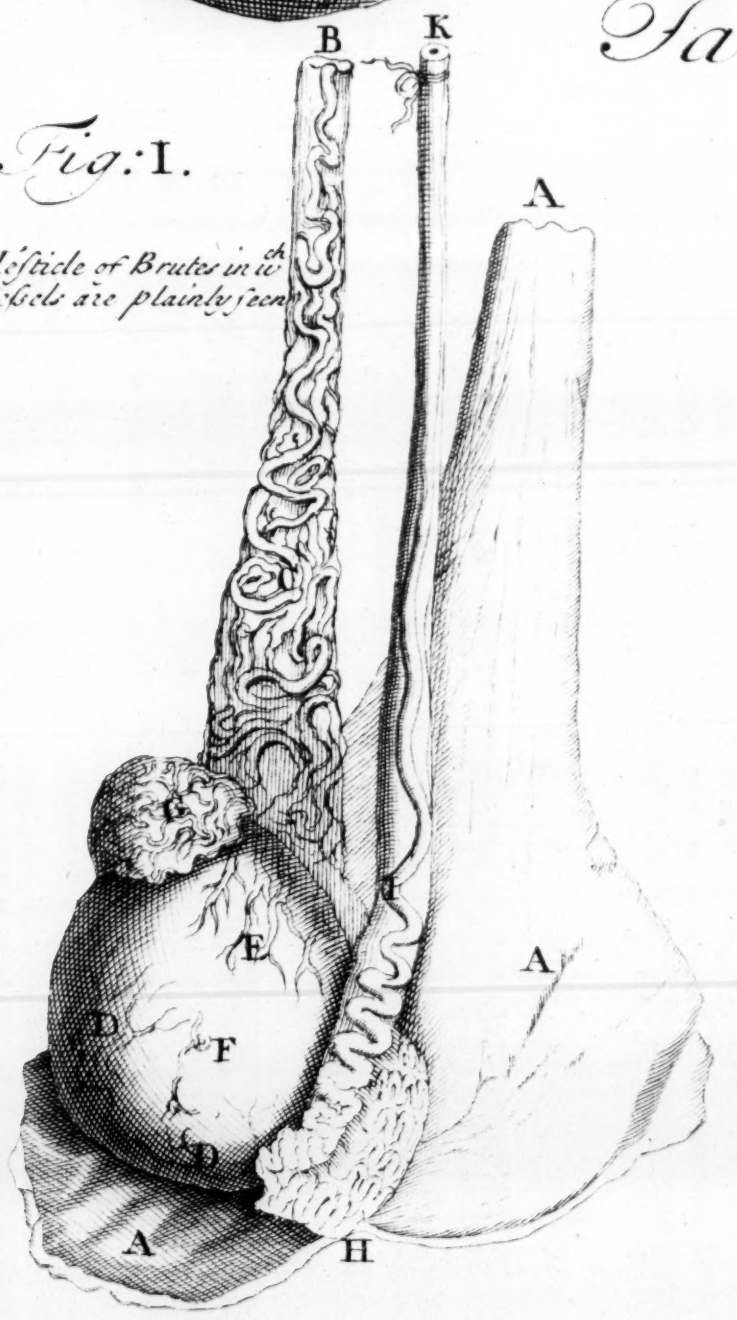


Fig. II.

The Testicle of a Dog full of Semen.

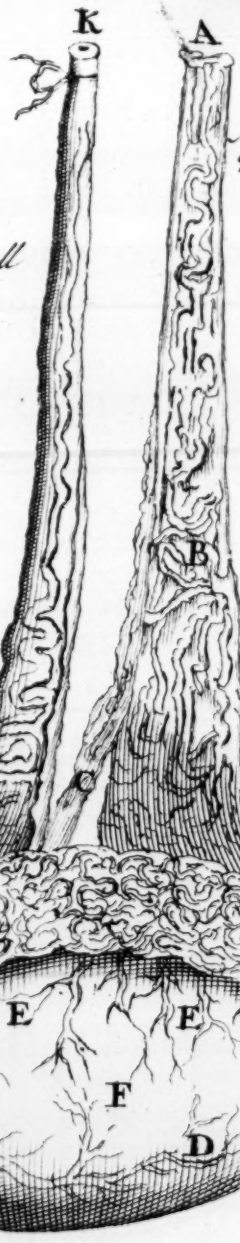
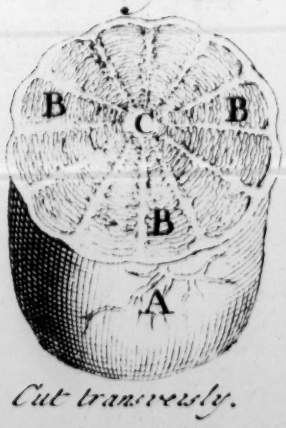


Fig. III.

The Body of a Dogs Testicle.

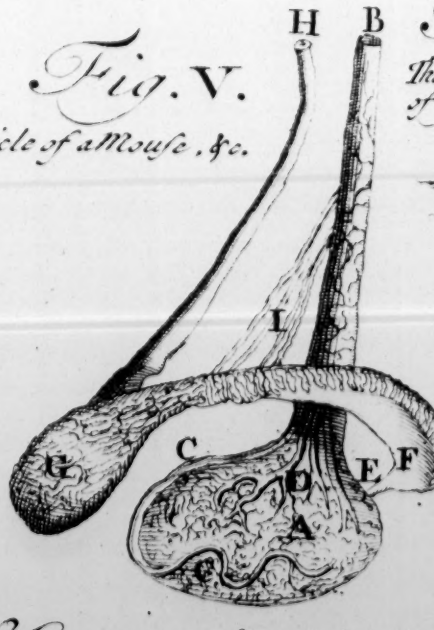
Fig. IV.



Cut transversly.

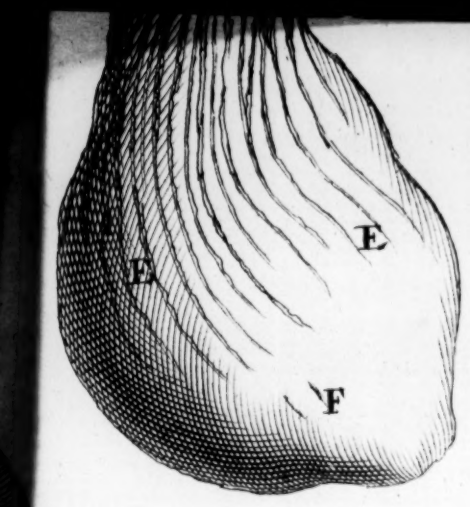
Fig. V.

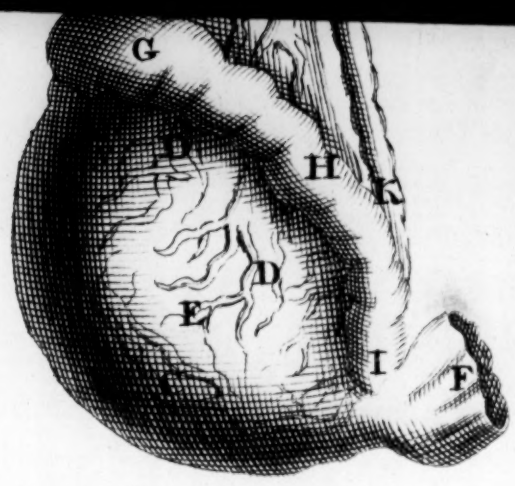
The Testicle of a Mouse, &c.



The Vessels of Generation in M

Tab. IV.





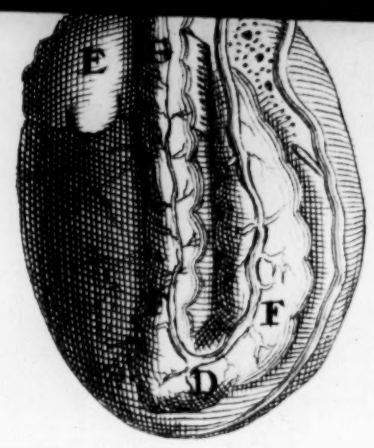


Fig. I.

Human Testicle cut longitudinal with the Epididymis & Body

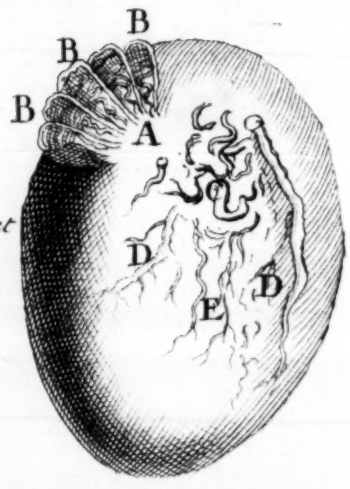
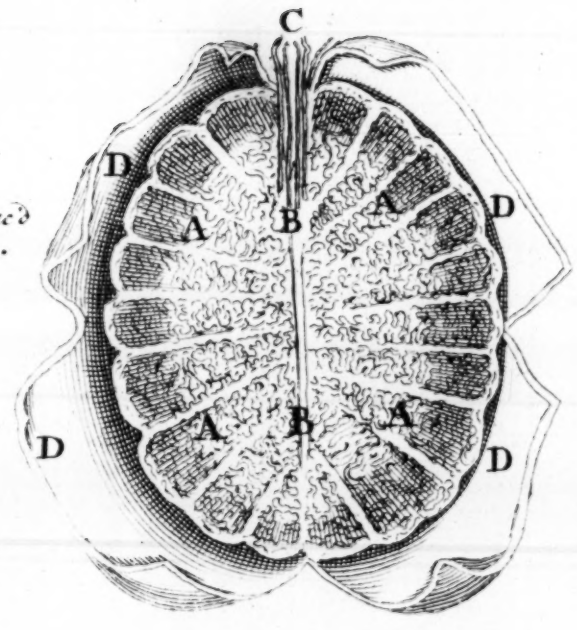


Fig. IV.

The Seminal Vessels placed among the small Membranes.



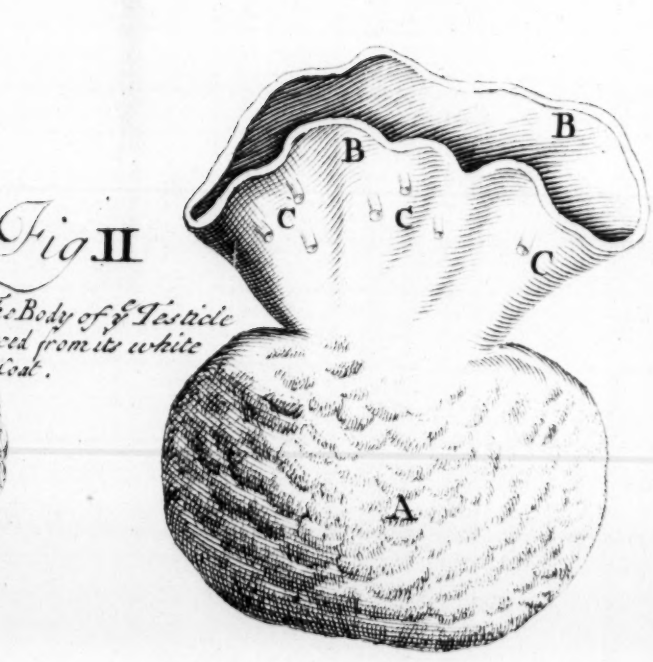


Fig. II

The Body of the Testicle freed from its white Coat.

Fig. V.

The Testicle cut transversely

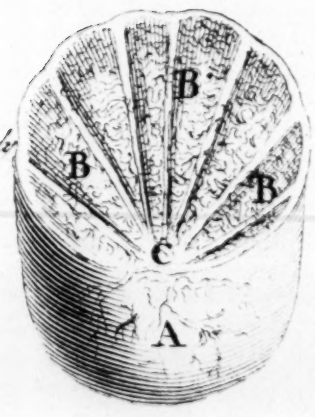


Fig. III.

The naked substance of the Testicle.

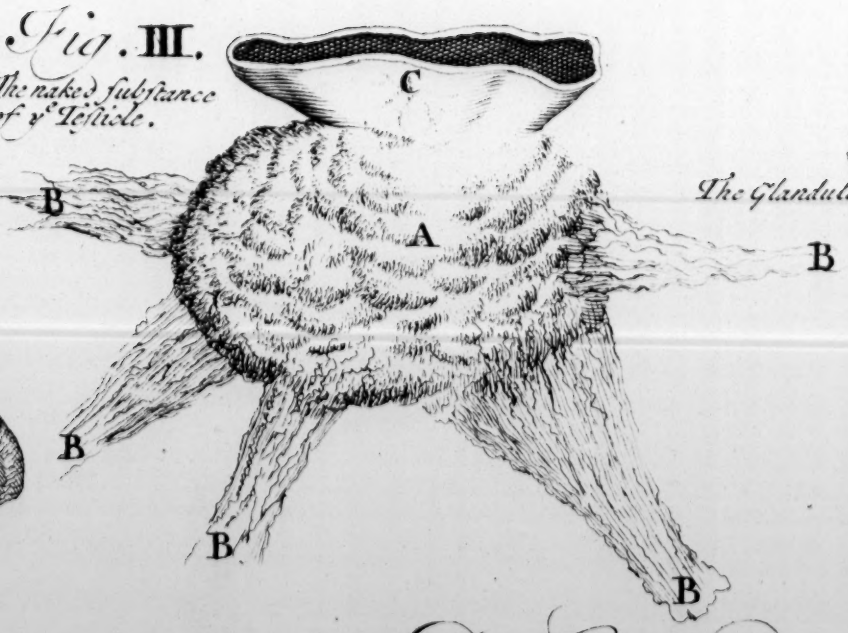
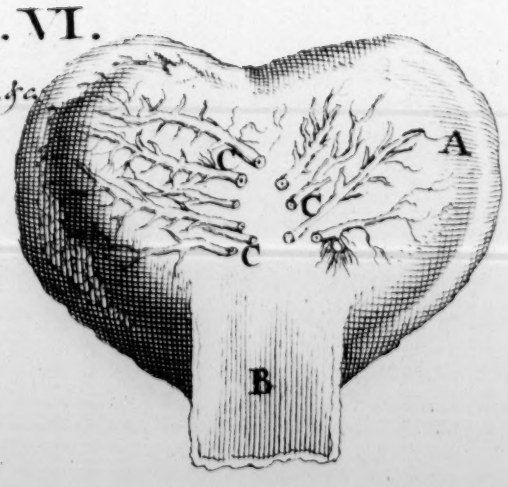


Fig. VI.

The Glandulous Body &c



...en, taken from De Graef.

Under the Head of the Genital Parts of Men are included, as principally deſcribed by the foregoing and the following Chapter, the Spermatick Veſſels, *the* Teſticles, *the* Paraſtatæ, *the* Vaſa Deferentia, *the* Veſiculæ Seminales, *the* Proſtates, *and the* Scrotum.

THE *Spermatick Veſſels*, otherwiſe called *Vaſa preparantia*, are *two Arteries* and *two Veins*; though in theſe eſſels Nature does not always obſerve the me Rule, varying often their Number, rigination, and Inſertion; but moſt comonly they hold that Number.

The *Spermatick Arteries* ordinarily ariſe om the fore Part of the Trunk of the *rta*, about two Inches below the Emulnts.

The Structure of theſe *Arteries* is very ſinlar; for, contrary to the Courſe of all ner *Arteries*, which are largeſt at their *Exit* m the Trunk whence they part, and grow dually leſs in their Courſe, theſe are leſs their Origine from the *Aorta*, than in their ogreſs towards the *Teſtes*. By this Stricture their Orifice, the Blood receives a Check its firſt going off from theſe Parts, whereby *Impetus* and *Velocity* are abated. The ſame d is anſwer'd by a different Mechaniſm in *adrupeds*, whoſe *Spermatick Arteries* are l'd and contorted in their Paſſage like a ew. For which different Methods of do the ſame Thing, Mr. *Cowper* gives a Rea which ſeems to me beyond Exception juſt, . *That if the* Humane Spermatick Arte *were contorted, as in* Quadrupeds, *the rtures in the* Abdominal *Muſcles of Men be much larger than now they are, and ld frequently let the* Inteſtines *deſcend into* Scrotum; *an Accident which, however, ofhappens. To ſuch* Ruptures (*as they are d*) Quadrupeds *are not ſo liable, though the Paſſages for the* Spermatick Veſſels *be much wider in them than in Men; becauſe the Poſition of the Trunks of their Bodies being* Horizontal, *their* Inteſtines *cannot preſs on the Proceſſes of the* Peritonæum, *as in Men, whoſe Poſture is* Erect.

Theſe *Arteries*, immediately after their meeting with the *Spermatick Veins*, enter together with them the *inner Lamella* of the *Peritonæum*, which affords them a *Coat*, wrapp'd up in which they run along the *Pſoæ* Muſcles, till they reach the *Proceſſus* of the *Peritonæum*, beſtowing ſome Branches in their Paſſage upon the *Peritonæum*. Here inſinuating themſelves into the *Duplicature* of the *Proceſſus*, and being ſtreightly cloath'd with it, they paſs the *Foramina* of the oblique and tranſverſe Muſcles of the *Abdomen*, and at about three or four Fingers Breadth from the *Teſticles* are divided into two unequal Branches, the bigger of which goes to the *Teſticle* it ſelf, where, after having enter'd the Subſtance of it, it is ſplit into an Abundance of *Ramifications*, diſpoſed like the Tendrils of Vines, which are diſpers'd all through it. The leſſer deſcends to the *Paraſtata* or *Epididymis*, and is there diſtributed as the other is, in the *Teſticle*.

The *Proceſſus* of the *Peritonæum* embraces theſe Veſſels very cloſely, and, together with them, exactly fills up the *Perforations* of the Muſcles, and ſo prevents the falling through of the *Inteſtines*, to which the erect Poſture might render them obnoxious if they were wider, as in Dogs, and ſome other Animals,

they are, whoſe *Horizontal* Poſture does not expoſe them to that Danger.

The *Spermatick Veins* take the ſame Courſe with the *Arteries*, but a little above the *Teſticles* they ſplit into ſeveral Branches, which unite again ſeveral Times, forming thereby that Sort of *Plexus* called, *Corpus Varicoſum Pampiniforme*, or *Pyramidale*. The Blood returned by theſe *Veins* is delivered on the right Side to the *Cava*, a little above the *Exit* of the *Artery* from the *Aorta*, and on the left Side into the *Emulgent Vein*, to avoid croſſing the *Great Artery*, in its Paſſage over which the Blood might be ſtopp'd by the Pulſation of the ſubjacent *Artery*, or perhaps the *Vein* it ſelf be broken. In theſe Veins are divers *Valves*, as well in the Parts nearer to the *Teſticle*, as at their *Exit* into the *Cava*, and left *Emulgent*.

Along with theſe Veſſels, on each Side, go two Branches of *Nerves*; one, from the *Plexus* of the *Pelvis*, form'd out of the Branches of the *Intercoſtals*; the other, from the ſecond Pair of the *Vertebræ* of the *Loins*; which latter, however, is very often not found.

The *Teſticles* are *ſoft white Bodies*, uſually in Number two, though ſome have naturally had three, and others but one: *Their Figure is Oval, and their Size about the Bigneſs of a ſmall Pullet's, or large Pigeon's Egg.* They have been thought to have been of a *Glandulous* Subſtance, and, according to the preſent prevailing Notion of the Structure of *Glands*, they may be allow'd to be ſo ſtill, notwithſtanding the Diſcovery of that inquiſitive *Anatomiſt* Doctor *de Graaf*, who finds them to be nothing but a Convolution of Veſſels of divers Kinds, whereof the principal are the Blood Veſſels before deſcribed, of which the *Arteries* bring the Blood from whence the *Seed* is to be ſeparated, and the *Veins* return it after that Separation made: The reſt of the *Teſticle*, which is much the greater Part, is made up of *Seed* Veſſels, which are indeed but one continued Series or Rope intricately convoluted, and wound up as it were into a Bottom, but adhering ſo laxly, that they are eaſily drawn out into length, and, in *Rats*, ſhaken from their cloſe Contexture, by firſt ſeparating the *Tunica albuginea*, and putting the *Teſticle* into Water, and then agitating it lightly, theſe ſeminal *Tubuli* will be very manifeſtly disjoin'd.

Some have fancied *Glands* to be neceſſarily interſpers'd for the Separation of the Seed, but no Man has been able yet to demonſtrate them, nor does the Neceſſity appear, if we ſuppoſe, as at preſent many do, that all *Glands* are but a Convolution of the ſanguineous and excretory Veſſels, though in other Parts their Texture be not ſo looſe, nor their excretory *Tubules* ſo conſpicuous.

Theſe *Seminal Tubuli*, or Veſſels, terminate in the *Paraſtates* or *Epididymidæ*, which are *tuberous varicoſe Bodies, lying upon, and adhering to the upper Part of the Teſtes*, of which they ſeem properly a Part, tho' of a different Form and Conſiſtence: For tho' the *Paraſtata* be only a various Convolution of the *Seminal Tubuli*, mix'd with the Blood Veſſels, as the *Teſticles* themſelves are; yet here thoſe *Tubuli* being united into one, the various Convolutions of which being more firmly bound together by a ſtrong Membrane ariſing from the *Tunica albuginea*, the Body of it feels more compact.

The *Teſticles* and *Paraſtates* are ſaid to be inclos'd in three *proper Membranes*. It is pretended the firſt is derived from the *Cremaſter Muſcle*, which we take to be a needleſs Multiplication of *Membranes*, all *Muſcles*, like this, having their *proper Membrane*, which is all that is meant herein. This *Cremaſter Muſcle* preſenting it ſelf, muſt be removed before the *proper Membrane* of this Part can be ſeen: It ſprings fleſhy from the Spine of the *Os Ilium*, and in its Deſcent expands it ſelf on the Surface of the *Tunica Vaginalis*, to which it firmly adheres.

The *Tunica Elytroides*, or *Vaginalis*, is a Continuation of the external *Lamina* of the *Peritonæum*, and is liable to be divided into ſeveral Membranes, which ſome Anatomiſts pleaſe themſelves with. It incloſes the whole *Teſticle*. The third Coat is the *Albuginea*, ſo called from its Colour, which is White. It is a ſtrong thick *Membrane*, very ſmooth on the outward Surface; the inward, which adheres to the Subſtance of the *Teſticle*, is rough and uneven. Into the upper Part of this *Membrane* are inſerted the *Blood Veſſels*, *Nerves* and *Lymphaticks*, which ſend from thence divers Branches into the Subſtance of the *Teſticle*.

The

The *Lymphaticks*, which do not appear in e common Diſſections, ſhew themſelves etty plentifully upon this *Membrane*, if a gature be laid upon the *Corpus Varicoſum* a *Dog*, or any other *Live* Subject. They go the common *Receptacle* of *Chyle*.

The common *Capſula*, or *Membrane*, where- the *Teſticles* are contain'd, is the *Scrotum*. is conſiſts of two *Membranes*, the exterior ing only a Production of the *Cuticula* or *is*, which is here ſomewhat thinner than other Parts, without any *Fat* under it. e inner Membrane, which is called *Dartos*, only an Expanſion of the *Panniculus Carno-*, which, together with the *Cutis*, is drawn o the Figure of a Purſe externally. This rſe is, as it were, divided by a Line, which ns longitudinally, and parts it into the ht and left Side, and is called the Suture. nſwering to this inwardly, is a Membrane ich divides the Cavity juſt in the ſame nner, being only a Production of the *Dar-*, as the *Mediaſtinum* is of the *Pleura*. It is e that diviſible into *Lamellæ*, and the *Te-les* are on each Side looſly connected to it, Means of their proper *Tunic*. It ſerves to tain the *Teſtes*, and to defend them from lliſion againſt each other, to prevent their ling down too low, in which it is auxilia- to the *Cremaſters*, and to promote the Cor- gation of the *Scrotum*.

From each *Teſticle* proceeds a round hollow dy, reſembling ſomewhat, in external Ap- rance, a large *Nerve*, which is call'd *Vas ferens* or *Ejaculans*. It ariſes from the Ex- mity of the *Epididymis*, and is nothing elſe a Production of the Seminal *Tubulus* or nnel, which is continued from thence to *Veſiculæ Seminales*. It is about the Bigneſs a ſmall Gooſe-Quill, and aſcending along th the *Vaſa Præparantia*, it makes ſeveral pentine or Worm-like Turnings and ndings before it leaves the Body of the ticle, where it compoſes that Body called *Epididymis*, and thence enters the *Abdo-*, with the aforemention'd Veſſels, thro' Perforations of the *tranſverſe* and *oblique* ſcles. Having ente'd the *Abdomen*, it is ected towards the Back of the *Bladder*, croſſing the *Ureter*, grows larger as it roaches the *Veſiculæ Seminales*, and then in contracting it ſelf juſt at the *Veſiculæ minales*, the two *Deferents* come together, and ſeem to paſs between them into the *Proſtates*, and through them into the *Urethra*, without communicating, till then, either with one another, or with the *Veſiculæ Seminales*, or *Proſtates*.

It has been a Controverſy among the *Anatomiſts*, whether the *Vaſa Deferentia* had any Communication with the *Veſiculæ Seminales*, or did depoſite into them the *Seed*, which they convey'd from the *Teſticles*. Doctor *Wharton*, *Swammerdam*, *van Horn*, and of late Doctor *Garth*, in his *Lectures* at the *College* of *Phyſicians*, have maintain'd the Negative, as others have done the Affirmative, whoſe Reaſons for their Opinions we ſhall take Notice of by and by.

The *Veſiculæ Seminales* are *two membranous Bladders*, ſituate between the *Veſica Urinaria* about the Neck, and the *Inteſtinum Rectum*. They are ordinarily three or four Fingers Breadth long, and one broad, and about the third Part of an Inch thick, though their Dimenſions vary very much in the ſame Subject, according as they are full or empty.

They conſiſt of divers membranous Cells, which are plainly to be ſeen in a *Veſicula Seminalis* blown up and dried, and afterwards cut. Theſe *Cells* open one into another, as appears by the ready Communication of the *Flatus*. They are not all of a Size, but ſome are greater, ſome leſs, and all are form'd out of the ſame *fibrous* Membrane, through the Contraction of which, by the Influx of the Animal Spirits in *Coitu*, ſome will have the Emiſſion to be occaſioned; though I cannot think the *Fibres* ſufficient for that Purpoſe.

Theſe *Veſiculæ* appear externally variouſly and unequally contorted and convoluted, reſembling the irregular Figure of the *Inteſtines* of a ſmall Bird, cover'd with a thin *Membrane*, upon which creep many Branches of *Arteries*, *Veins*, *Nerves* and *Lymphaticks*.

From each Side they empty themſelves, without communicating with each other, into a ſmall Duct, which, about a Finger's Breadth below the Neck of the Bladder, is inſerted ſeparately into the hinder Part of the *Urethra*.

Between the Mouths of each of theſe Ducts is a ſmall *Septum* plac'd, to hinder the Seed coming from one Side from ruſhing upon, and ſo ſtopping the Diſcharge of the other.

This

This *Septum* is called, *Caput Gallinaginis*, or *Galli Gallinacei*, and on each Side of it, thro' the fore-mentioned Orifices, the *Seed* ruſhes into the *Urethra*.

But leſt the *Seed* ſhould perpetually leak at each Orifice, a *Caruncle*, ſerving for a *Valve*, is placed, which hinders it from ouzing weakly out, but when it is emitted with Vigour, gives Way, and after the Force is over, recovers the Situation again.

The *Proſtates* form a *ſpongy glandulous Body, ſomewhat flattiſh on its upper Surface, ſituate juſt below the Neck of the Veſica, about the Bigneſs of a Wall-nut.* Authors have aſcrib'd to it a Subſtance of two Kinds; one *Glandulous*, and the other *Spongy* or *Porous*, which latter ſeems in Reality to be nothing elſe but a *Congeries* of very minute Veſſels, and extreamly ſmall membranous *Cells*: In the Middle of thoſe run the *Excretory Ducts* of the *Veſiculæ*, paſſing quite through without any Communication. It has excretory Ducts of its own pretty numerous. *De Graaf* does not remember to have obſerv'd them fewer than ten in Men, and in Dogs he has ſeen near an hundred. Every one of theſe diſcharges it ſelf into the *Urethra*, ſome above, ſome below the *Caput Gallinaceum*, but all more laterally than the Orifices of the *Veſiculæ Seminales*; having each of them its proper *Caruncle*. Out of theſe iſſues a Sort of *glutinous tranſparent Liquor*, which ſome would have to be a third Sort of *Seed*, but in my Opinion ſerves only to lubricate the Paſſage of the *Urethra*, and thereby to prevent any Adheſion of the *True Seed*, which might hinder its being emitted with a ſufficient *Impetus*. The *Proſtates* are externally cover'd with a fibrous Membrane, ſomewhat like that of the *Veſiculæ*, and through it are diſpers'd the ſame Sort of Veſſels, and from the ſame Parts, as *Arteries* and *Veins* from the *Hypogaſtricks* and *Meſaraicks*, and *Nerves* from the *Plexus* of the *Pelvis*.

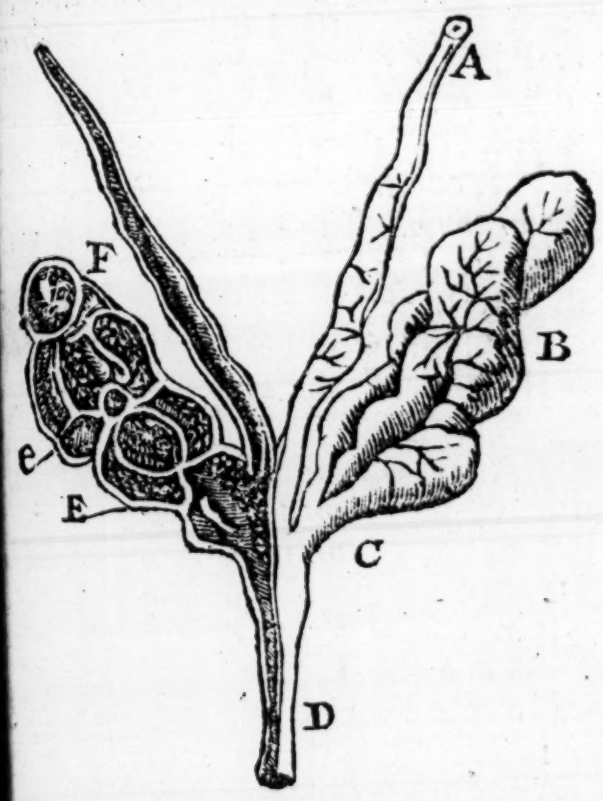
Thoſe who with *de Graaf* (which is the greateſt Part of Anatomiſts) hold that the *Veſiculæ Seminales* are *Receptacles* only of *Seed*, elaborated before in the *Teſticles*, and convey'd thither by the *Vaſa Deferentia*, are preſs'd by the Arguments of their Adverſaries, who urge, that the *Vaſa Deferentia* are continued down to the *Urethra*, without imparting or receiving any Thing by the Way; and this they infer from the *Vaſa Deferentia* being brought, as it were, below the *Veſiculæ Seminales*, and approaching them only at their Extremity, where whatever they contain ſhould rather, as they think, go out than come in. But this is no concluſive Argument, unleſs they did prove by an abſolute mechanical Neceſſity, that no Fluid in a Humane Body could enter and come out again at different Times, and under a different Force or Preſſure, by the ſame Orifice.

But not to anſwer one Objection with another, which might eaſily be done, it is plain that the *Vaſa Deferentia* and *Veſiculæ Seminales* do communicate one with another by the Eaſe wherewith the *Flatus* paſſes from the *Vas Deferens* to the *Veſiculæ* of the ſame Side, and the Facility wherewith it is blown up, or Liquors are injected by a Syringe that Way. This proves that there is a Communication in Fact, and it is not ſufficient to ask, Why Nature ſhould chooſe to make the Seminal Liquor, as it were, turn back again to aſcend and fill the *Veſiculæ*, rather than to have inſerted the *Vas Deferens* into the upper Part of it, and ſo to have fill'd it the more obvious Way? For tho' we ſhould confeſs the Reaſon of ſuch a Procedure to be ſtrange and incomprehenſible to us, yet that would not alter the Nature of the Fact. It ſhould indeed, caution us to be more modeſt in pronouncing concerning Particulars where we were not ſufficiently inform'd, and rather incline us ingenuouſly to confeſs our Ignorance, and to wait till Time and farther Application, or the Induſtry of others, ſhall open to us the Myſtery; than, when we cannot diſcover the real Way by which Nature operates, to fall to inventing, firſt the End, and then the Means, which has been an old, but a very diſingenuous, Method of Philoſophizing in *Phyſick*.

But the Difficulty before us, is neither ſo great, nor ſo puzling, as to force Men to any ſuch Shifts: For admit that the *Vaſa Deferentia* be continued to the *Caruncles* of the *Urethra*, yet if the Neck of the *Veſiculæ Seminales* join them higher, and form to each other one *Tubulus*; or if it be but inſerted into the *Deferens* with a patent Orifice, it is eaſy and natural to conceive, that the Seed that is but gently protruded along the *Deferens*, arriving at the *Caruncle*, ſhall

here be ſtopp'd, and the Protruſion ſtill ontinuing, ſhould rather deflect laterally nto the *Veſicula*, which is open, altho' that nay be call'd in ſome Meaſure remounting, han force the Obſtacle of the *Caruncle*, whoſe eſiſtance is greater than that of the Weight ſo much *Seed* as one of theſe *Deferents* ill contain.

This is ſo far from being hard to be con-ived, that it is the conſtant and regular ourſe of all Fluids, in ſuch Caſes. For xample; Let us ſuppoſe a *Tube*, form'd in e Figure of a Y, or, which is all one, of the *eſiculæ Seminalis* on the Left Side here figur'd.



A. *The Left* Vas Deferens.
B. *The Left* Veſicula Seminalis.
C. *The Place of their* Communication, *at ich the* Seed *is reflected into the* Veſicle.
D. *Their* Common Orifice *cloſed by a* Ca-ncle *inſtead of a* Valve.
F. *The Right* Vas Deferens *cut through after ving been inflated and dried.*
E, e. *The* Cells *of the* Veſicula Seminalis, *hey appear in that State.*

f you pour Water into *A*, it will readily cend to *D*; but if at *D* there be a Valve c'd, which neither the Weight of the Wa-, nor the Force of its Direction, are able overcome the Reſiſtance of, then the Wa-will deflect at *C*, and riſe up into *B*.

This ſimple Piece of Mechaniſm is what many ingenious Men have ſtumbled at, and thought themſelves obliged to ſuppoſe ſeveral Sorts of *Seed* to be form'd in theſe uncommunicating Parts: A Trouble certainly they would not have put themſelves to, if they had obſerved how eaſily the *Flatus* paſſes in a Body recently dead. But perhaps the ill Succeſs of this Experiment tried upon a ſtale Body, when the Membranes were cold and ſtiff, and the Parts collaps'd and cohering, made theſe learned Perſons maintain, that there was no Communication.

We ſhall not ſpend any Time in refuting that Doctrine of three Sorts of *Seed*, becauſe it was apparently taken up to avoid this Difficulty. The *Seed* of the *Teſticles*, and *Veſiculæ Seminales*, appear manifeſtly the ſame, and nothing was wanting to make them be allow'd ſo, but to prove the Communication. The *Proſtatal* Liquor is by moſt acknowledg'd not to be true *Seed*, no more than that which is emitted by *Women*: Nor is there any good Reaſon, why any Body ſhould call it ſo, the Appearance being ſo very different, and another ſufficient Uſe found.

The learned Doctor *Wharton*'s Ground of imagining a peculiar Sort of *Seed* to be ſeparated in the *Veſiculæ* (which was his Obſervation of a great many *Glandules* in them, which he ſuſpected to be the *Organs* through which the *Seed* was ſeparated) would have been more material than the former, if thoſe *Glands* which he mentions had been conſiderable for their Number or Magnitude. But they are ſo far from being ſufficient for that Office, that they are not conſpicuous, and by moſt other Anatomiſts have been unobſerv'd. *De Graaf*, who ſought for them expreſly, denies their Exiſtence. It ſeems therefore unreaſonable to aſſign that Office to them, whilſt their Exiſtence is controverted.

However, it is not improbable that the *Veſiculæ Seminales* may be furniſh'd with *Glands* as the *Veſiculæ Fellea* and *Urinaria* are: But then we cannot aſſign them any other Uſe, than thoſe *Glands* have in their reſpective Parts, that is, to afford a *Mucous* Lining; with this Difference, that it is not to protect the Membrane from any *Acrimony* of the *Seed*, but to *lubricate* it, and facilitate the Expreſſion of it, leſt it ſhould otherwiſe adhere to the Inſide of the Membrane, as all viſcous Fluids are apt to do, to the Sides of a dry Veſſel.

Of

Of the PENIS.

SYLLABUS

Præcipue obſervandorum in

Penis
- *Cuticula.*
- *Cutis.*
- *Præputium.*
- *Structura.*
- *Ligamenta* { *Frænum.* / *Suſpenſorium.*
- *Glandulæ* { *Inguinales.* / *Præputiales.* / *Mucilaginoſæ Corperi.*
- *Corpora Cavernoſa* { *Penis* { *eorum* / *Urethræ* { *Subſtantia.*
- *Bulbus---- ejus Septum.*
- *Glans.*
- *Muſculi* { *Acceleratores Urinæ.* / *Directores* } *Penis.* / *Tranſverſales* } *Penis.*
- *Vaſa* { *Arteriæ.* / *Venæ.* / *Nervi.* / *Lymphæductus.*

THE *Cuticula* of the *Penis* differs not from that of other Parts, unleſs on the *Glans*, where it is very delicate and thin, and appears to have a ſmooth Surface, not rough and ſquamous, as that of other Parts, when view'd with Magnifying Glaſſes.

The *Skin* it ſelf is not ſo thick as it is generally found on other Parts. The doubling of it on the *Glans* makes the *Præputium*. Nature does not ſeem more wanton in any Part of her Works than in this, eſpecially the *Prepuce*, for the Figure and Proportion of which I can ſcarce find any Standard. From hence, perhaps, aroſe the Neceſſity of *Circumciſion*, ſo generally practis'd in all the *Oriental* Parts, as well as among the *Jews* to this Day. The firſt of which uſe it out of Cleanlineſs, and to prevent Diſeaſes, which the Detention of the *Mucus* of the *Subpræputial Glands* might breed in thoſe hot Countries: For even here I have ſeen ſome, who having large *Præpuces*, ſuch as they call *Filberd Præpuces*, who have been frighted at the odd Appearance of that *Mucus* ouzing out, upon meer Plenitude, from between the *Prepuce* and *Glans*. Perhaps the Great Lawgiver of the *Jews* had a Regard to this Convenience in the firſt Inſtitution of *Circumciſion*: For we ſtill meet with a great many Inſtances, where that Operation, or ſomething like it, is neceſſary. It is tied to the lower Part of the *Glans*, by a *Ligament* called the *Frænum*. In this alſo Nature varies, for it is often ſo ſhort, that unleſs it be divided, it will not admit of perfect *Erection*.

At the Connexion of the other Part of the internal Skin of the *Præputium*, are divers oval and roundiſh little *Glandules* placed irregularly, and that not only in the Neck or Joining of the *Glans* to the *Corpora Cavernoſa*, but on the *Glans* it ſelf. By theſe *Glandules* is ſeparated that Liquor that renders the Agitation of the *Præputium* on the *Glans* eaſy. When this Liquor becomes rancid, as it does in old People, and in *Venereal* Contacts, it excoriates the *Glans* and *Præputium*, and very often exulcerates, and renders the *Prepuce* liable to Contract, and obliges the Patient to have it divided. The Extremity of the *Prepuce* is apt to grow ſo ſtrait in old Men, that they cannot bear the *Glans*, perhaps through the Defect of frequent Erections.

The other *Ligament* belonging to the *Penis* is called *Suſpenſorium*, from its Office, in holding up the *Penis* to the *Oſſa Pubis*. It ariſes from the fore Parts of thoſe Bones, and becoming thicker, divides for a Paſſage to the great Vein of the *Penis*, and is faſtened to the upper Parts of the *Corpora Cavernoſa Penis*, on each Side the great Vein of the *Penis*.

The *Penis* is naturally deſtitute of *Fat*, and when it happens to have any (as there are Inſtances) it is a Diſeaſe, and incom-

mode

modes it in the Execution of its Office. In Children you will commonly find *Fat* on the *Penis*, but in grown Bodies it's ſeldom found, tho' the *Membrane* between the *Skin* and *Corpora Cavernoſa* remain; and it is not improbable, that frequent *Erections* may prevent their *Cells* being charged with the *Oil* which compoſes the *Fat*, as appears by the Microſcope. This Want of *Fat* makes the Skin of this Part very looſe and diſtendible, and the membranous Body between the Skin and *Corpora Cavernoſa* diviſible into ſeveral Coats, as appears when this Part becomes affected in an *Anaſarca*, in which the Membranes of this Part and the *Scrotum* have been found thicken'd to more than three or four Inches. The external Teguments removed, the Body of the *Penis* offers it ſelf: Firſt,

The two *Corpora Cavernoſa*, and the *Corpus Cavernoſum Urethræ*, and their Veſſels, frame the Body of the *Penis*. The two cavernous Bodies, by ſome call'd *Corpora Nervoſa*, *Spongioſa*, *&c.* have two diſtinct Beginnings from the lower Sides of the *Oſſa Pubis*, where they are ſmalleſt, which ſoon growing large and thick, join to each other where they meet with the cavernous Body of the *Urethra*, for which they leave an Interſtice or Channel in their lower Side, wherein is received the *Cavernous Subſtance* of the *Urethra*. The ſuperior Surface of thoſe cavernous Bodies have a ſmall Interſtice or Channel alſo near the *Pubes*, in which the *Vena Penis* is lodg'd. Both theſe join by the Intervention only of a *Septum*: This, towards the back or upper Part of the *Penis*, is very thick and ſtrong, and ſeems to be compos'd of the two outward thick Membranes, or Caſes of the *Corpora Cavernoſa* join'd to each other. The other Extremities of the two *Corpora Cavernoſa* are *Capt* with the *Glans*.

The third cavernous Body of this Part is called *Corpus Cavernoſum Urethræ*, becauſe the *Urethra*, or Paſſage of Urine in the *Penis*, is inclos'd with it. Its external Figure differs very much from that of the two *Corpora Cavernoſa*, for whereas they are leſſen'd at their two Extremities, this is there largeſt, and leſſen'd in its Middle. Its upper Part, that is placed between the two Beginnings of the *Corpora Cavernoſa* before they unite, I call, after Mr. *Cowper*, its *Bulb*, from its Figure, which is large, thick and round, not unlike a Clove of Garlick, or an Onion. Its external Membrane is here very thin, and it is divided according to its Length, by a *Septum* that is thickeſt toward the *Urethra*, which is not incompaſs'd with this *cavernous* Body, till it paſſes under the two *Corpora Cavernoſa* at their Meeting. This bulbous Part of the *Corpus Cavernoſum Urethræ*, is placed in that Part called *Perinæum*, which is between the *Strotum* and *Anus*, and is cut through to come at the *Urethra*, in the Operation of Cutting for the Stone in the Bladder. It is cover'd with the *Muſculus Accelerator Urinæ*, of which elſewhere. The middle Part of this *Corpus Cavernoſum Urethræ* is almoſt cylindrical, but the Paſſage for the Urine is not through its *Center*, but inclines to its upper Part next the Body of the *Penis*.

The other *Extremity* of this *Corpus Cavernoſum Urethræ* is again dilated, and makes that Body called the *Glans*. Its external Figure is well known. It receives the Extremities of the *Corpora Cavernoſa Penis* in a Cavity or Depreſſure of it. Its internal reticular Subſtance is cloſer than that of the *Penis*. The Symmetry of theſe Parts being known, we come next to treat of their Veſſels and internal Structure. Firſt of

The *Arteries*, which ariſe ſometimes from the internal *Iliac* Branches, but moſt commonly from the lower Parts of the *Umbilical Arteries*, whence it is, perhaps, that this Part is leſs than uſual, by tying the Navel-ſtring too cloſe, not only by the Retraction of the *Urachus* through its Continuity with the *Bladder*, and conſequently the *Penis*; but the *Arteries* of the *Penis* ſpringing from the *Umbilical* are liable to Coarctation, if they are over-extended, whereby the requiſite Plenty of influent Blood is denied the *Penis*. Before theſe *Arteries* reach the *Penis*, they commonly ſend out two or three Branches on each Side, the two inferior of which carry *Blood* to the *Muſculi Directores Penis*. The two ſuperior convey Blood to the adjacent Parts, particularly to the *Muſculi Levatores Ani*, between which and the *Muſculi Marſupiales Femorum* theſe great Trunks paſs; but marching over the *cavernous Bodies* of the *Penis*, they are both ſub-divided into two large Branches, the two inferior of which, *i i*, paſs to the *Bulb* of the *cavernous Body* of

the *Urethra*; but the two ſuperior, *k k*, are both ſub divided again; the external, *d d*, running on the ſuperior Surface of the *cavernous Bodies* of the *Penis*, the internal, *l l*, entring their *Capſulæ*, paſs through the Middle of each *cavernous Body*, *D D*, wherein they divide into innumerable Branches; from whoſe capillary Extremities are continued ſo many *Veins*, in the Channels of which are divers Apertures into as many *Cells*, *D*, that communicate with each other, that empty themſelves into larger Venous Ducts, *C*, running on the ſuperior Surface of the *Penis*, ſome of which join with the Veins of the *Prepuce*, *d*; others make one large Trunk, which is called *Vena Penis*, *M*, marching on the *Dorſum Penis*, immediately under the *Ligament* that ties the *Oſſa Pubis* together internally; by which *Ligament* that *Vein* is compreſs'd in an *Erection*, as ſhall be ſhewn by and by: But this *Vein* proceeding further on the *Proſtatæ*, it is there divided, and enters the *internal Iliack Veins* on each Side. The *Veins*, which ariſe in like Manner from the *Corpus Cavernoſum Urethræ*, paſs from its *Bulb* through the *Muſculi Acceleratores*, *C C*, and are compreſs'd by thoſe *Muſcles*.

The *Nerves* ſpring from a Trunk compoſed by the *Coaleſcence* of the third of the *Os Sacrum*, and a Branch remitted from the great *Crural Nerve*, which, after their Union, provide *Nerves* for the *Teſtes*, *Perinæum*, and *Muſcles* of this Part; which aſcending on the *cavernous Bodies* of the *Penis*, expand themſelves on its upper Surface, *c c*, and are afterwards diſtributed to all the Parts of the *Penis*.

The *Lymphæducts* of the *Penis* are very numerous on its Surface under the Skin, in that looſe Membrane that is in the Place of the *Membrana Adipoſa*. If you blow into the *Veins* of a *Dog's Penis*, its *Lymphæducts* will be inflated after its *cavernous Body* is extended: Theſe, like the *Lymphæducts* of the lower Parts, diſcharge their *Lympha* into the *Glandulæ Inguinales*. Hence, perhaps, the morbid Matter in *Claps* is transferr'd into theſe *Glands*, and cauſes thoſe *Tumors*, called *Buboes*, from the *Glands* call'd *Bubones*. On this Account the opening theſe Tumors, before the uſual Time for *Suppuration* in other Tumors, appears neceſſary, leſt the peccant Matter be convey'd by the exporting *Lymphæducts* of thoſe *Glands* into the Maſs of Blood; of which we meet with too many Inſtances.

The internal Structure of the *Corpora Cavernoſa*, agrees exactly with that of the *Splen*. The *Arteries* of the *Penis*, after they enter the *Corpora Cavernoſa*, are diſtributed into its *reticular* Subſtance, which are chiefly compoſed of *membranous Filaments*, deriv'd from the *Capſulæ* or Sides of the *Corpora Cavernoſa* or their *Septa*. Theſe *Filaments* are variouſly intertext with (as they paſs from the Sides of the *Corpora Cavernoſa*) and ſupport the Ramifications of the *Blood-Veſſels* and *Nerves*. The *Veins* of the *Corpora Cavernoſa* do not paſs from it, as they commonly do from other Parts, in particular Channels; but their Sides are here punch'd with numerous Holes, that open into this *cavernous Subſtance*, which have ſuch Communications, as that if you blow into either Beginning of the *Corpora Cavernoſa*, they both are readily diſtended; but the *Corpus Cavernoſum Urethræ* will not be affected, tho' the other two are diſtended with Wind, unleſs in ſome Subjects, (which is very rare) in whom the *Veins* happen to let the Wind paſs from the *cavernous Bodies* of the *Penis* to that of the *Urethra*. From this Structure of the *Penis*, we may be inform'd of the particular Uſe of its Parts.

This Structure ſhews that the *Penis* is ſtrictly an Organ of *Generation* only, and that the Conveyance of *Urine* was not conſidered by Nature in this Mechaniſm, that being as well anſwer'd in Birds, Women, and all Female Creatures, another Way. But an Incitement to the Propagation of their Species had perhaps been wanting, but for this Organ; tho' the Way of Propagation in moſt Kinds of Fiſhes ſeems to argue the contrary. But of that we ſhall have Occaſion to ſpeak more at large hereafter. At preſent it may ſuffice, that without ſuch an Inſtrument the *Seed* of the moſt *perfect* Animals could not be convey'd to the Place of *Prolification*, and that an Alternation, as Occaſion requires, of *Erection* and *Flaccidity*, was abſolutely neceſſary; the firſt, to the Performance of its Office; the latter, for the Security of the Part: Since without an *Erection* it were impoſſible to emit, and lodge the *Seed* where it ought to be; and with a conſtant One, almoſt as impoſſible to ſecure the Part from

many

many of those Injuries to which it would be perpetually expos'd; not to mention the Loss of Instigation, which must be a necessary Consequence of constant Erection.

That the Blood is the Matter which distends the *Corpora Cavernosa Penis* in an Erection, is manifest from abundance of Experiments, tho' the most certain is that of firmly tying the *Penis* of any Animal (as has been done frequently to a *Dog*) *in Coitu*, in which nothing but Blood has been found that distended it. In the Bodies of Criminals that hang long after Death, the *Penis* becomes erected, the Blood in that Position falling to the inferior Parts, and stopping there. By blowing into the Blood-Vessels after Death, the *Penis* becomes erected.

This was first observ'd by the accurate Mr. *Cowper*, upon viewing its *Veins*, after he he had distended them with Wind; whence it was very plain, that the *external Trunks* pass'd some under its *Skin* only, and some over the *Ossa Pubis*; which, for Distinction, he called *Venæ Præputii*. Besides these, a vast Number of *Veins* (on the *Dorsum Penis*) unite, and empty themselves into one *Trunk* called *Vena Penis*, which passes immediately under a transverse Ligament of the *Ossa Pubis*, and is compress'd by the Approximation of the *Dorsum Penis* to the Ligament of the *Pubis*. This Application of the *Dorsum Penis* is effected by its *Musculi Directores*, pulling down the *Crura* of the *Corpora Cavernosa Penis*, which are tied up at their Juncture in the Body of the *Penis*, to the *Ossa Pubis*, by the *Ligamentum Suspensorium* above-mentioned.

This cannot happen to the *Cavernous* Body of the *Urethra*, because there is no *Bone*, whose Position (in *Humane* Bodies, and most *Quadrupeds*) can give Rise to a *Ligament*, which can have that Effect on its *Veins*. Wherefore the *Musculi Acceleratores*, embracing the *Veins* of the *Bulb*, do that Office, though not so effectually as in the *Penis* it self; whence it is that the *Glans* is not always perfectly distended with the *Penis*, and soonest becomes flaccid on an *Erection*.

The *Blood*, by these Means, being hinder'd in its Return, the *Corpora Cavernosa* must necessarily be distended, if we consider the Structure of them above-mentioned, with Respect to the *Veins*. The *Arteries*, which before were flaccid, have now their Trunks also extended, and do more plentifully import Blood into the *Corpora Cavernosa*. But since it is absolutely necessary some Part of the detain'd Blood should be still passing off, lest it becomes grumous and unfit for a Reflux, the *Venæ Preputii* communicate with those of the *Penis* it self, as before observ'd; whereby Part of the Blood may be returned from the *Penis* during its *Erection*, and give Way to a fresh Supply from the *Arteries*, and preserve the *Circulation* in it uninterrupted. By this we are taught how to relieve an obstinate *Priapism*, by opening the *Vein* of the *Penis*.

This admirable Contrivance, in disposing these *exporting sanguiferous Ducts*, so that some are compress'd, whilst others remain altogether free and open, is not only seen in the *Penis* of Men, and *Pudenda* of Women, but in those Parts of all other Animals that have fallen under our Examination, with some Difference of Instruments only in some particular Creatures; as Mr. *Cowper* has instanced in the *Male Opossum*, *Philosophical Transactions*, N° 290. P. 1584. This Retardation of the *refluent Blood* is chiefly continued by Means of a *Sphincter Muscle*. In a *Male Porpass*, long since dissected by Mr. *Cowper*, were found *two Bones*, with their *Ligaments*, framed on Purpose for this End. In a *Dog* he some Time since observed likewise a *Digastrick Muscle*, whose *middle Tendon* pass'd transversly on the *Veins* of that Animal's *Penis*, which seemed to be provided by *Nature*, that when *in Coitu*, tho' the Dog is turn'd off the Back of the Bitch, and his *Penis* drawn off from the *Ossa Pubis*, which, without that transverse Muscle, would make Way for the Blood to pass off, and let its *Bulb*, by which the *Dog* is tied to the *Bitch*, grow flaccid.

The *Muscles* of the *Penis* are two Pair, and one odd *Muscle*; the first, that offers it self in Dissection, is the *Accelerator Urinæ*, which appears on dividing the *Skin* and *Fat* in the *Perinæum*. It is often joined with the *Sphincter Ani*. It arises *tendinous*, but soon grows *fleshy*, from the upper and fore Part of the *Urethra*, as it passes under the *Os Pubis*, its fleshy Part encompassing the *Bulb* of the *Corpus Cavernosum Urethræ*. Both Sides of this

Muſcle meet in a middle Line, correſponding to the *Seam* in the Skin over it. It continues ſo united about two Inches in Length, then detaches two fleſhy *Elongations*, *c c*, which become thin *Tendons*, at their Terminations on the *Corpora Cavernoſa Penis*. This is commonly made a Pair of Muſcles, but in Truth is but one Muſcle. Its upper Part, that covers the *Bulb*, when in Action, ſtreightens the *Veins* that paſs through it from the *Corpus Cavernoſum Urethræ*, and hinders the *Reflux* of the *Blood* in an *Erection* of the *Penis*, and by the repeated Contractions of this upper Part, drives the *Blood* in the *Bulb* towards the *Glans*. The two *Elongations*, that part on the *Urethra*, and aſcend to their Terminations on the *Corpora Cavernoſa Penis*, ſo compreſs its Channel, as to force out the contain'd *Seed* or *Urine*, from which latter Uſe it has its Name.

The *Erectores Penis*, ſo called from their Uſe, ſpring fleſhy each from the *Os Iſchium*, below the Beginning of the *cavernous* Body of the *Penis* on the ſame Side, and after an oblique Progreſs, end partly tendinous, and partly fleſhy, in the Beginning of that *cavernous Body*. When theſe act, the *Penis* is drawn to the *Pubes*, and, by Means of the *Ligamentum Suſpenſorium Penis*, its *great Vein* is applied to the *tranſverſe Ligament* of the *Oſſa Pubis*, and the refluent Blood hindered from paſſing that Way, whereby its *Corpora Cavernoſa* become diſtended. The laſt Pair of *Muſcles* that belong to the *Penis*, are called, from their Poſition,

Tranſverſales Penis. Theſe are often wanting, and frequently vary in different Subjects: Sometimes they are deriv'd from the *Sphincter Ani*, and terminate in the *Bulb* of the *cavernous Body* of the *Urethra*. At other Times you'll meet with a *Muſcle* on one Side only. But ordinarily they ariſe from the *Iſchium* near the former, and are inſerted on both Sides the *Corpus Cavernoſum Urethræ*, immediately below its *Bulb*. When they act, they dilate either the *Bulb*, or that Part of the *Corpus Cavernoſum Urethræ*, to which they are faſten'd.

There remain yet to be accounted for, three ſmall *Glands* diſcover'd by Mr. *Cowper*, and not yet taken Notice of by any other *Anatomiſt*. They all empty themſelves into the *Urethra*, and are by Mr. *Cowper*, from the Tenacity of the Liquor which they ſeparate, called the *Mucous Glands* of the *Urethra*. The two firſt diſcovered of theſe are about the Bigneſs of a *French Bean*, of a depreſſed oval Figure, of a yellowiſh Colour like the *Proſtates*, and lie on each Side the *Bulb* of the *cavernous Body* of the *Urethra*, a little above it, *G G*. Their *Excretory Ducts* ſpring from their *internal* Surface *Ab*, next the inner Membrane of the *Urethra* C, whence deſcending about half an Inch, they begin to grow leſs, and piercing that Membrane obliquely, open into the *Urethra* at *D*, by two diſtinct *Orifices*, juſt below its Bending, under the *Oſſa Pubis in Perinæo*, where they diſcharge a *tranſparent viſcous* Liquor.

Beſides this Pair, there is a third *Mucous Gland*, diſcover'd likewiſe by the ſame Mr. *Cowper*, to whoſe happy Sagacity, Induſtry, and communicative Temper, the Inquiſitive into this Part of Knowledge are infinitely indebted. This is deſcrib'd by him in the Appendix to his Ἐγχείρισις, and is a ſmall conglobate yellowiſh Gland like the former, but ſomewhat leſs. It is ſituate about the Angle of Flexure of the *Urethra* under the *Oſſa Pubis in the Perinæum*, near the *Anus F*, as it was drawn from a Preparation which Mr. *Cowper* has ſtill by him. To find this *Gland*, the *Corpus Cavernoſum Urethræ* muſt be divided lengthways to the inner Membrane of the *Urethra*, which muſt be cautiouſly freed from the Body; which done the *Gland* will appear in the Place already mentioned. It has two *Excretory Ducts* which enter the *Urethra* obliquely about a Quarter of an Inch below the Orifices of the two former, *K*, and diſcharge a Liquor like theirs both in Colour and Conſiſtence.

Mr. *Cowper*, who is always ingenious, and generally right in his Conjectures about Anatomical Matters, thinks there may be two Uſes of this *Mucus*: The Firſt, to hinder any Remains of *Urine* from mixing with the *Semen* in the *Urethra Tempore Coitus*, which I can find no Reaſon to expect there at that Time. Yet I muſt ſubſcribe to his Opinion that *the main Deſign of Nature in framing these Glands ſeems to reſpect the grand Work of Generation*. For by their Situation they muſt neceſſarily be compreſs'd upon Erection, and conſequently diſcharge their Contents before the *Teſtes* and *Veſiculæ Seminales*, which

not ſubject to ſo immediate a Force. I apprehend therefore, that their *Mucus* ſerves to lubricate the Pipe of the *Urethra*, and thereby to facilitate the *Emiſſion* of the *Semen*, and render it more vigorous and projectile than otherwiſe it could probably be, if ſo viſcid a Liquor as the *Semen* were to paſs through a Channel abſolutely dry, to which it would be apt to adhere, and ſo its Projection be obſtructed.

Much leſs can I think, that they were by Nature contrived to defend, by the *Mucus* which they afford, the *Urethra*, from the Acrimony of the *Urinous* Salts: For, to anſwer that End, the *Urethra* ſhould be conſtantly lin'd with it, and the Diſcharge continual, as it is in a *Gleet*, when the *Caruncula* which cloſes the *Excretory Duct* of any of theſe *Glands* happens to be eroded, as we obſerv'd it once in a Servant of mine; of which Mr. *Cowper* has given us the Hiſtory, and the Figure, in his *Deſcription of theſe Glands*, publiſh'd before his Εὐχρειστία, both which I have thought worth the transferring hither. But as theſe *Glands* do not emit their Liquor *in Statu Sano*, but upon Compreſſion, which cannot happen but in Erection, and that a pretty ſtiff one too, by reaſon the Reſiſtance of the *Caruncle* muſt be forced, it is not probable that this Liquor ſhould be always diſcharged previous to the *Urine*, which is as often made with a *flaccid Penis* as otherwiſe. Nor indeed do I ſee any need to hunt for any other Uſe than that which I have aſſign'd in the preceding Paragraph.

Mr. *Cowper* having, with his Deſcription of the firſt diſcovered Pair of the *Glands*, hinted his Suſpicion, that an *inveterate Gleet* might proceed from a *Venereal* Ulcer happening upon the *Oſtiolum* of either of theſe, whence, if an abſolute *Eroſion* of the *Caruncle* enſued, an *incurable Gleet* might follow, an Opportunity preſented it ſelf to me to examine into the Certainty of that Opinion, in a Servant of mine who died of a *Peripneumony*, but had been ſome Years troubled with an obſtinate *Gleet*. In this Subject we found that the *Caruncle*, which ſhould have cloſed the *Duct* of the *Mucous Gland* on the Left Side, had been eroded by an Ulcer, and the Orifice of that, and of the Left *Duct* of the ſingle *Mucous Gland*, laid into one, as appears by *Tab.* IV. *Fig.* I. drawn from it by Mr. *Cowper*. Hence proceeded an almoſt conſtant Dripping of a diaphanous, viſcid, roapy Liquor, ſuch as theſe *Glands* furniſh, which is what we call a *Gleet*, and muſt neceſſarily happen to all Perſons under the like Circumſtances.

He that conſiders, that a *Clap* is nothing but an Ulcer rais'd in the *Urethra*, by the Inſinuation of ſome *Virulent*, or, to ſpeak more properly, *Acrimonious* Purulent Matter into it, will not wonder, that it ſhould often hang and fix its Seat at the *Oſtiola* of theſe *Excretory Ducts*. But of theſe Matters, I ſhall take another Occaſion to ſpeak more largely.

Of

Of the Parts of Generation in Men, and the Diſeaſes ſubject thereto, particularly thoſe of the Penis. *From* Verheyen, *St.* Hilaire, &c.

THE Parts which ſerve for Generation are called the *Pudenda*, the baſhful or modeſt Parts, and are divided into two Kinds, the Common or Proper; the Common Parts are ſuch as are found in both Sexes, as the Spermatick Veſſels, the Teſticles, and the *Vaſa Deferentia*; the Proper Parts are thoſe which are common to Men, as the *Paraſtatæ* or *Epididymidæ*, the Seminal Veſſels, the *Proſtatæ*, the Yard; and ſo the Womb to the Female. Many Authors are of Opinion, that all theſe Parts deſerve the Title of Noble as well as the Brain or the Heart, becauſe the Brain and the Heart only are inſtrumental to the Preſervation of the Individual, but that theſe Parts ſerve for the Propagation of the whole Species.

The Parts which firſt appear in Man are the Spermatick Veſſels, which are four, to wit, two Arteries and two Veins: The two Spermatick Arteries ſpring from the Trunk of the *Aorta*; the Spermatick Veins ariſe from the Teſticles, to empty themſelves into the *Vena Cava*. The Artery and the Vein, whereof one riſes and the other deſcends, on each Side approach one another, and are covered from the *Peritonæum*. The different Branches which the Vein produces in Aſcending, Winding and Turning, forms that *Plexus* which is called the *Pampiniforme*, varicous or pyramidal Body, the Artery contributing nothing towards it.

The Spermatick Veſſels are larger in Men than in Women, and yet ſome of thoſe in the ſame Subject larger than others, for the Arteries are larger than the Veins; and the Reaſon remains to be enquired into why the Left Spermatick Vein is inſerted into the Emulgent, and not into the Trunk of the *Vena Cava*, as the Right is. Theſe two Arteries, and theſe two Veins, were called by the Ancients the *Vaſa præparantia*, or preparing Veſſels, becauſe they believed that the *Seed* began to be prepared there, and for that Reaſon they ſuppoſed that the Veſſels were united together by ſenſible Apertures, which they called *Anaſtomoſes*, by Means of which they fancied there was a Mixture made of the Arterial with the Venal Blood, and that ſtopping there for ſome Time in the Pampiniforme Bodies, they might receive the laſt Tincture of Impreſſion of the *Semen*.

But the Principal the Moderns follow is directly oppoſite to that Error, ſince they apprehend that the Blood is directly carried by the two Arteries from the Teſticles, and that if theſe divide themſelves each into two ſmall Branches a little before they enter, it is in order the better to penetrate their Subſtance in gaining Admiſſion at ſeveral diſtinct Parts, and that the Particles of the *Semen* which the arterial Blood carries along with it might be more exactly ſeparated. Hence the Circulation makes it appear, that the Reſidue of this Blood is carried back by the Spermatick Veins into the *Vena Cava*, and that there is no *Anaſtomoſes* of the Arteries with the Veins, not only in this Part, but in no other of the whole Body.

The *Teſticles* are ſuch of the Genital Parts as are contained in the *Scrotum* or Bag, and hang out of the *Abdomen*, being appointed to elaborate the Seed; and they are called *Teſtes*, becauſe they are the Evidences of Manhood. They are otherwiſe called *Didimi*, that is to ſay *Twins*, becauſe they are uſually Two, for it is rare to meet with Three, or to find no more than one; notwithſtanding there is a credible Report goes of an Illuſtrious Family in *Germany*, the Males where-

of have always Three, and they are reckon'd more than ordinarily vigorous in the Act of Coition. They are ſeated at the Root of the Yard in the *Scrotum*, to ſtop the natural Heat from encreaſing too much upon them from the Lower Belly, which would render Men too laſcivious; for Experience ſhews, that thoſe Animals who have their Stones within the Body, are much hotter, and more fruitful, than others. They are much of the Shape and Size of a Pigeon's Egg, and ſometimes like that of a Hen's, being on each Side ſomething flat; but we may nevertheleſs obſerve ſome Difference, according as the neighbouring Veſſels are more or leſs tumefied. Commonly the Left is a little larger than the Right, and hangs ſomething lower, and it rarely happens that the Right is any Thing bigger than the Left. It happens in the Venereal Diſeaſe, that ſometimes one of the Stones, and ſometimes both of them, are ſwell'd, and become much larger than ordinary; and this Swelling, after the Cure of the Malady, returns to its former Condition without much Damage.

The Tunicles or Coats which incloſe the Teſticles are Five; *viz.* Two Common, which are, the *Scrotum* and the *Dartos*; and Three Proper, which are, the *Eritroides*, the *Elitroides*, and the *Albugineous*. The Firſt of the Common is the *Scrotum* or Purſe. It is compoſed of a Cuticle and a Skin, which is much finer and thinner in this Part than in any other of the Body. It is ſoft, wrinkled, and without Fat, being covered with Hair after about Fifteen or Sixteen Years of Age. It divided into the Right and Left Part by a Line or Suture, which begins at the *Anus*, and paſſes through the *Perinæum*, ending at the *Glans*. The Second Common Membrane is called the *Dartos*: According to the Antients, it was a Continuation of the Fleſhy Muſcle; but agreeable to the Moderns, a Cutaneous Muſcle compoſed of ſeveral carneous Fibres; and it is by Means of this Muſcle that the *Scrotum* is contracted, and drawn up into a Purſe. The Firſt of the proper Coats is the *Eritroides*, that is, the Red Coat. It is made up of fleſhy Fibres, which makes it look Red, and is produced by the *Suſpenſor* or *Cremaſter* Muſcle of the Teſticles. The Second is the *Elitroides*. It is like a Pipe. Hence it is called the Vaginal. It is formed by the Dilatation from the Production of the *Peritonæum*. The internal Superficies is even and ſmooth, the external rough. The Third is the Albugineous Coat, ſo called becauſe white. It is nervous, ſtrong and thick. This is what immediately covers the Subſtance of the Teſticle, and takes its Riſe from the Coats which incloſe the Spermatick Veſſels.

The *Teſticles* are of a particular Subſtance, and that which is like no other in the whole Body beſides. It is white, ſoft and lax, becauſe it is compoſed of ſeveral little Seminal Veſſels, and a great Number of other Capillaries, which are from the Branches of the Arteries, Veins, Nerves, Lymphaticks, and the Roots of the *Vaſa Deferentia*. The Subſtance of the Teſticles is no otherwiſe form'd than as a Piece of Weaving, or a Contexture of an infinite Number of minute Veſſels, whoſe Structure is ſurprizing. There are Two Muſcles belonging to the Teſticles, which are the *Cremaſters* or *Suſpenſores*, which take their Riſe from the Point of the *Os Pubis*; or, as *Riolan* will have it, from the fleſhy Extremity of the aſcending Muſcle.

The Uſe of the *Teſticles* is to filter the Seed, and to ſeparate it from the Blood. It is no difficult Task to explain how this Filtration is made, if we do but obſerve what has been ſaid concerning the Structure of the Teſticles; for as ſoon as we know that they are compoſed of Arteries, Veins, and an infinite Number of ſmall Seminal Veſſels, which have a Communication with the Roots of the *Vaſa Deferentia*, we cannot doubt that the Arteries convey a Liquor in them compoſed of Blood and Seed, which is ſeparated by the ſmaller Seminal Veſſels. This Seed being ſo ſeparated, is received by the Roots of the *Vaſa Deferentia*, which conveys it from the Teſticle into the *Epididymis* or *Paraſtata*, from whence it paſſes afterwards into the ſame Trunk from the *Vaſa Deferentia* which diſcharges it ſelf into the Seminal Veſſels, where it reſts to be ejected.

The *Epididymidæ* or *Paraſtata* are ſmall round Bodies, which ariſe from one of the Ends of the Teſticle. They are likewiſe ſo called, becauſe of their reſting upon the Teſticles, which are called *Didimes*. They

are

are like to a Silkworm, and are ſtrongly tied to the *Tunica Albuginea* of the Teſticle. Their true Uſe is to receive the Seed ſeparated in the Teſticle, to prepare it further for its Return, and to convey it by little and little into the Trunk of the *Vaſa Deferentia.*

The Seminary or Seminal Veſicles are like little Cells, diſpoſed after the Manner of thoſe of Raiſins, which receive the *Semen* that flows into them from the Teſticles by the *Vaſa Deferentia.* Their Figure reſembles that of the Guts of Birds, which dilate in ſome Places in their Circumvolutions, and contract in others. They are compoſed of a thin Membrane, with an Artery, Vein and Nerve, that are very fine; and ſome believe they are made up with Lymphatick Veſſels. Their Size is of a Finger's Breadth, and the Length of three, or thereabouts; but they are moſt commonly bigger on one Side than the other; and are ſeated on both Sides before the Ligaments of the Urinary Bladder. They are double, to ſupply any Accident that may happen by Wounds, Tumours, Lithotomy, or any other Cauſe whatever, whereby Generation may be prevented, and the Male rendered uſeleſs to Poſterity.

There are ſeveral Cavities or Hollows, which are like a Bundle of various little Cells form'd in the Manner of a Grape, and which exactly reſemble the Cells of Pomegranate Seed, ſo that all the *Semen* cannot paſs in any one ſingle Action, but that the beſt remains in the turning and winding of the Paſſages. In the Part or Place where theſe narrow and obſcure Pipes or Conduits diſcharge the Seed into the *Urethra*, there is a ſmall Membrane ſtretch'd in Form of a Valve, ſeated in ſuch Manner, that it ſhall not hinder the *Semen* from flowing from the Veſicles, but only to ſtop it from entering into the Urinary Bladder.

The Cauſes of a *Gonorrhœa* are either the Eroſion or Excoriation of the little Channels, or elſe the more inviſible Pores, by the Acrimony of the *Semen* contracted in an impure Coition; or if the Veſſels are weakened, they become from hence the more relaxed, as it happens ſometimes in Old Perſons, who force Nature by uſing too much Venery. *Veſalius* and *Spigelius* have found in dead Bodies that have been affected with the *Gonorrhœa* the Paſſages or Channels very much dilated.

Galen and *Highmore* will have it, that theſe Veſicles diffuſe into the *Urethra* a certain Oily Humour, which moiſtens the Paſſages, and makes them ſlippery; ſo that they are not eaſily injured by the Acrimony of the Urine or Seed: But *Diemerbroek* aſſerts poſitively, that theſe Veſicles contain nothing of Seed in them, and that the Moiſture or Slipperineſs of the *Urethra* does not proceed from any Oily Humour ſupplied from theſe Veſicles, but otherwiſe; to wit, from ſome mucilaginous Portion of the Aliment which is beſtowed upon the Bladder, the Guts, and ſeveral other Parts of the Body.

Of the Diſeaſes ſubject to the Parts of Generation in Men. From the ſame Authors.

THE Teſticles are ſometimes affected with an Intemperature, with an Inflammation, Ulcers and Contuſions. The Intemperature eaſily communicates itſelf to the preparing Veſſels. The internal Cauſes are, the Intemperature of the principal Parts that are affected by the Spirits and Humours, acrid, bilious or pituitous: The external Cauſes are, Air, Diet, Drink, and ſuch like Things. This Diſeaſe is known, firſt by the Cauſes that precede it, and next by the Effects that follow after. There is a great Burning perceived in the hot Intemperature, and a great deal of Coldneſs in the contrary. The Intemperature of theſe Parts is a great Enemy to Generation, the cold and the dry occaſioning Barrenneſs, and are more difficult to cure than the moiſt and the hot.

When the Nutritious Juice and the Seed becomes acrid, as it happens in the Venereal Diſeaſe, the Teſticles are inflamed and ſwelled, which is occaſioned by the Obſtructions that are made in the Parts, which hinder the Motion of the Fluid, and ſtops it from returning back into its proper Channels again; and it is eaſy to ſee, by the Texture of the Teſticles, that what has Power to produce Obſtructions, is capable of raiſing the Inflammation. Likewiſe the Corruption of the Seed may be the Occaſion of ſuch a Tumor. This we ſee every Day happen to thoſe who have the Pox, and in the *Gonorrhœa*, becauſe the *Paraſtatæ* and Seminal Veſſels are ulcerated, and the Fermentation of the vitiated *Semen* will make the Teſticles grow larger, harder, and produce a *Scyrrhus*. Beſides, if the Matter remain upon the Part 'till 'tis acrid, ſo that it brings on an Obſtruction, it frets the little Tubes ſo, that the Liquor flows out and extravaſates, which ſpreading about produces Excreſcencies of Fleſh called the *Hyperſarcoſis*, or *Sarcocele*, which conſiderably adds to the Bulk of the Teſticle. The Inflammation is known by the Redneſs of the Tumor, by the Heat and pricking Pain, by the Redneſs and Swelling of the *Scrotum* on that Side the Pain lies, and by the Fever that uſually attends.

The Scyrrhous Tumour is known by the Sight and Touch, as likewiſe by the Want of Pain, Heat, and the Fever. The Inflammation and the Tumour of the Teſticles is to be dreaded, becauſe of the Accidents that attend it. There happens ſometimes an Abceſs and a *Scyrrhus*, for Want of preſent Application of reſolving or diſcuſſing Remedies. If the Veſſels of the Teſticle are broke, and that the extravaſated Liquors coagulate themſelves together by the Mixture of different Fluids, there happens an *Hyperſarchoſis*, which is often incurable: Therefore the Inflammation of the Teſticles ought not to be neglected, becauſe it may terminate in an *Abceſs*, from whence we may be apprehenſive of a *Gangrene*.

The Tumor which ariſes from nothing but Wind, and is very well known by Feeling, is no Ways dangerous or difficult to cure; but on the contrary, that which is produced by acrid Humors, is not ſo very eaſy. The Ulceration ſucceeds ſometimes after the Inflammation, becauſe in the Inflammation the Veſſels of the Teſticle are ſo tender they often break, and ſo the Nutritious Juice flows out, and being once extravaſated, it ferments, grows acrid, pricks and tears or frets the neighbouring Parts, which afterwards turns into a conſiderable Ulcer, as is frequently ſeen in ſcorbutick and pocky Caſes; and ſometimes from a ſingle Eroſion of the Teſticle there is a cancrous Ulcer made, which waſts or conſumes all the Subſtance. This Ulcer is eaſy to know, for it emits a white *Pus*; but it is very difficult to cure.

The Contuſion of the Teſticle is cauſed by ſome Blow, Fall, or Cold. When it is conſiderable, ſo that the Subſtance of the Teſticle is open upon the Veſſels, there happens an *Hæmorrhage* or Flux of Blood, and the Patient is ſenſible of a great deal of Pain, occaſioned by the *Vaginalis* that incloſes the Teſticle, and by the Spermatick Veſſels. This Inconvenience is very dangerous, becauſe it ſometimes leaves a *Scyrrhus* Tumor behind it that is troubleſome a Man's Life after: But what is more to be feared, is the Mortification.

The *Scrotum* or *Cod* is liable to ſeveral Indiſpoſitions, but particularly to the *Hernia*, to Inflammations, Excoriations, Ulcers and Wounds. The Species or Kinds of the *Hernia* of the *Scrotum* are, the *Epiplocele*, and *Enterocele*. The other Tumors, which are improperly called *Hernia's*, are, the *Hydrocele*, the *Pneumatocele*, *Sarcocele*, and *Cirſocele*. The *Epiplocele* is a falling down of the *Epiploon* or Caul into the *Scrotum*, and the *Enterocele* is that of the Guts. Theſe two *Hernia's* are eaſy to know: There appears a conſiderable Swelling, with much Pain, but the Tumor is of the Colour of the Skin. Sometimes the Parts fall at one Stroke into the *Scrotum*, and ſometimes the Tumor begins by a *Bubonocele*. The Patients feel a griping Pain, vomit their Excrement, but chiefly the Aliment, when the Guts cannot be return'd into the Belly. We diſtinguiſh the *Epiplocele* from the *Enterocele*, becauſe the *Epiploon* or Caul makes ſuch a Tumor as is found more uneven than that which is made by the Inteſtines, and more painful in the returning it from the *Scrotum*; for the Guts, when they are put back, will make ſome ſmall Noiſe, which the Caul does not.

The *Hernia's* of the *Scrotum* are dangerous, becauſe of the Difficulty which is oftentimes met with in making them re-enter the Belly, and the ſtrangling of the Gut, which occaſions a *Miſerere*, and a Gangrene. It is obſervable, that the *Caul* ſometimes grows very large, and that its own Weight will tear it from the Inteſtines, and occaſion it to drop into the *Scrotum*. The *Hydrocele* is an aqueous or watery Tumor, cauſed by the Rupture or Breach of the Lymphatick Veſſels, which comes from an internal Cauſe, like the Dropſy of the Belly; or rather from an external Cauſe, as a Fall or a Contuſion, becauſe that the Blood by ſtopping and coagulating in the Parts makes Way for the *Serum* to ſeparate. If the *Hydrocele* be the Conſequent of a dropſical *Aſcites*, the Operation will be to no Purpoſe, becauſe the Water is continually falling down from the Belly into the *Scrotum*. All the *Hydroceles* which do not ſucceed an *Aſcites*, proceed commonly from the Lentor of the Blood's Motion, or from its Diſſolution. Falls and Contuſions may likewiſe contribute to their Riſe, becauſe the Blood ſtanding upon the Parts makes Room for the Separation of the *Serum*.

The *Pneumatocele* is ſometimetimes a Conſequent of Convulſions in the *Scrotum*. Theſe convulſive Motions contract the *Dartos* and the Skin. Likewiſe Tranſpiration is ſtopped, and the extravaſated *Lympha* is rarified by the Heat of the Part. This *Pneumatocele* is eaſy to be known; the *Scrotum* is ſtretch'd like a Football, we may perceive a little Noiſe when we ſtrike upon it. Neither is it difficult to cure when the Tumor is freſh and new; but if the *Tenſion* of the *Scrotum* is conſiderable, and that this convulſive Tenſion remain long, we may be apprehenſive of ill Succeſs.

The *Sarcocele* is a fleſhy Tumor that is hard and livid, cauſed by the Contuſion and Strokes of the *Scrotum* and Teſticles; for the Blood ſtopping there, and gathering together more plentifully in the wounded Fibres, and the Pores relaxing from the Veſſels that are torn off, it changes it ſelf into a Kind of Fleſh, which increaſes ſucceſſively in the Teſticles or in the Membranes of the *Scrotum*, where it generates the *Sarcocele* or *Dartos* according to ſome Authors.

The *Circeſole* is nothing elſe but a Tumor full of thick *varicous* Knots, that are hard and round, made from the Dilatation of the Veſſels of the *Scrotum* and the *Teſticles*. The Knots are called *varicous*, becauſe they ariſe after the ſame Manner as the *Varices*. We might add to all theſe Kinds of falſe *Hernia's* that which is called the *Spermatocele*. It is a Tumor made by abundance of Seed, which by Fermentation dilates the ejaculatory Veſſel and the *Epididymis*; ſo that in feeling the Teſticle we perceive the *Epididymis* and the *Vaſa Deferentia* wrinkled and *varicous*.

The Inflammation of the *Scrotum* is produced the ſame Way as that of other Parts. It is known from its Tumor, Redneſs, Heat and Pain; and it is obſervable, that it is ſometimes attended with a Fever. The Excoriation of the *Scrotum* is occaſioned by the Acrimony of the *Lympha*, which ulcerates the cutaneous Glands of the Skin of that Part, and creates a Burning Pain. The Ulcer differs not from the Excoriation but as it is leſs or greater. The Inflammation, the Excoriation, the Ulcers and Wounds of the *Scrotum*, are Symptoms that are not to be neglected, for fear of the Gangrene.

The principal Diſeaſes which attend the *Penis* or *Yard* are, the *Lipodermus*, the *Phymoſis*, *Paraphymoſis*, *Priapiſme*, *Salyriaſis*, *Emphyſeme*, the Inflammation, Warts and Ulcers. The *Lypodermus* is when there is no *Prepuce* that is liable to a Wound or an Ulcer. There is beſides this an *Hypodermus*, which is when the *Prepuce* deſcends below the *Glans* or Nut, which comes from a convulſive Motion of the *Prepuce*, occaſioned by an extraordinary Agitation of the Spirits. Theſe Symptoms are not dangerous, but they procure a great deal of Pain and Uneaſineſs to the Patient.

The *Phymoſis* is when the *Prepuce* or Foreskin will not ſlip over the *Glans*. Sometimes this is natural; for when it happens ſo that the Gland is wrapp'd up or encloſed in the *Prepuce*, it cannot be diſengag'd or freed by any Exerciſe or Handling; for ſometimes the *Prepuce* ſticks ſo cloſe to the Gland, that it ſtops the flowing of the Urine. Sometimes this Indiſpoſition is accidental, caus'd by ſome Inflammation, by Cancers, Warts, Induration of the Part, and ſometimes by Medicines improperly applied.

The *Paraphymoſis* is when the *Prepuce* ſticks under or behind the Gland, without being able to be drawn over or to cover it. The Cauſe of this Strangulation proceeds frequently from the Foldings of the Skin that form a Kind of Purſe, and ſometimes from the Inflammation that attends the *Prepuce* from ſome preceding Cancer or Tumor. The Yard is ſo much blown up, that it forms three or four ſmall Bags one after the other, which proceed partly from the Obſtruction, and partly from the Reflux of Blood and Spirits from the *Penis*. The Signs of the *Paraphimoſis* are, a Swelling of the *Penis*, and the Bags upon the *Prepuce*. We commonly obſerve a Tumor at the End of the *Prepuce*, which is full of a reddiſh Water. This Tumor will encreaſe ſo very large, that if it be not ſcarrified to diſcharge the Tumor, the Part is in Danger of a Mortification.

The *Frænum* or Cordee upon the Yard proceeds oftentimes from a Convulſion, or a Tumor, or ſome acrid and viſcous Humour lodg'd in the *Urethra*, where it fixes, becauſe the Ligament of the *Penis* is ſhorten'd, the Gland contracts it ſelf, and the Yard bends or grows crooked. In ſhort, the *Penis*, when erected, pulls down the Gland ſo forcibly, that it gives exquiſite Pain, by endeavouring to extend or ſtretch the Nerves that were before contracted. If by ſome Convulſion the Yard remains crooked, this Indiſpoſition may hinder Generation. If this Crookedneſs is from the Birth, it is incurable.

The *Priapiſm* is an involuntary Erection of the Yard, where it remains ſtiff, without contracting at Pleaſure; which ariſes from the abounding of Blood or Spirits. This Indiſpoſition happens ſometimes in the *Hernia*, in the Cholick, Epilepſy or Falling Sickneſs. The *Priapiſm* is difficult to cure, becauſe it is always occaſioned by a convulſive Motion. The Diſeaſe frequently changes into a *Vertigo*, *Apoplexy*, or ſome other Mortal Malady.

The Want of Erection and Power of Coition, commonly called Frigidity, proceeds from three Cauſes, according to *Etmuller*. The firſt is from the Erectors of the Muſcles being paralytick, or ſome other Ways affected, ſo as to hinder their Contraction; which frequently comes from Bruiſes upon the Loins, the *Os Sacrum*, or neighbouring Parts. The ſecond Cauſe is from the Abſence or Want of Animal Spirits, which ought to flow into the proper Muſcles, and are impeded from Weakneſs, Conſumption, or ſome other preternatural Cauſe. The third is attributed to the Paſſions, as Exceſs of Joy, Fear, Baſhfulneſs, *&c.* which employ the Animal Spirits another Way.

The *Satyriaſis* differs from the *Priapiſm*, becauſe there is always a Deſire to ſatisfy the Paſſions. It uſually proceeds from an Inflammation of the *Penis*, becauſe the nervous Fibres being extended and agitated by the Fermentation of the Fluid, that excites a Motion in the Yard, which gives Pleaſure, and diſpoſes the Party to Acts of Venery.

The *Emphyſeme* of the *Penis* is occaſioned by a thick or groſs *Lympha*, which rarefies it ſelf into Vapours. We know it by a Tumor that appears ſometimes tranſparent, and which is often without Pain. This is thick, and blown up like a Bladder full of Wind. From the Root of the Yard to the End, it is ſo ſwelled that one cannot perceive the *Glans*. This is not a dangerous Diſeaſe, becauſe it is attended with no ill Symptoms, but is eaſily cured with Diaphoreticks, and the Application of reſolving and emollient Medicines. As to Excreſcencies, Ulcers, and Warts, they are very viſible, and of no great Difficulty to cure: But what is neceſſary to be ſaid in relation to the Venereal Diſeaſe in all its Parts, we ſhall leave that to be treated of after we have gone through all the Parts of Generation both in Men and Women.

Of the Organs of Generation in Women.

HItherto we have followed the Method that the Connexion and Dependance of the Parts upon one another have led us into. But this being a ſingle Subject, and a Specification of the Difference betwixt Sexes, we ſhall follow the Method of *De Graaf* in it, as the moſt natural, and the moſt eaſy for an Inquirer to follow.

The *Pudendum Muliebre* is divided into Parts *External* and *Internal*: The *External* are thoſe which offer themſelves to the View without Diſſection, tho' ſome of them require a Diduction of the *Labia* before they can be ſeen. Theſe are the *Rima*, *Labia duo*, *Mons Veneris*, *Clitoris*, *Nymphæ duæ*, the *Exitus* of the *Meatus Urinarius*, and the Orifice of the *Vagina*.

The *Rima* is nothing elſe but the external Aperture ſituated below the *Os Pubis*, between it and the *Anus*; and the Space betwixt the *Rima* and the *Anus* is called the *Perinæum*.

The Skin on each Side of the *Rima* is ſupported and plump'd up with the *Fat* of the *Membrana Adipoſa*, which is here thicker than ordinary, and makes together the *Labia*.

Juſt above the *Labia*, between the *Inguina*, is the Space which is called the *Pubes*, the middle and moſt prominent Part of which has been nam'd *Mons Veneris*, which is a little Protuberance occaſioned by the more than ordinary Collection of *Fat* under the Skin in that Place. All theſe Parts are cover'd with Hair, as moſt other Parts, where the *Miliary* Glands of the Skin are larger than ordinary, and covered with *Fat*, uſually are.

Theſe being abſolutely external, are expoſed to view without Diduction, and they, as well as the adjacent, have been called by Variety of Names, which either the Wantonneſs or other Humours of Men have furniſh'd them with: But thoſe being of no Service to our preſent Purpoſe, we ſhall omit them, and ſtick only to the moſt ſimple and familiar of them among Anatomiſts, as Modeſty directs us.

In the upper Part of the *Pudendum*, juſt within the *Labia*, is the *Clitoris*; a Body ordinarily about the Size of the *Uvula* when it is not relax'd: But ſometimes, by extraordinary Means, and in extraordinary Caſes, it will be extended almoſt to the Bigneſs of the *Penis* of a Man, which at all Times it reſembles very exactly in its Figure, except that it is not perforated. The extraordinary Size of this Part, and its Propendence ſometimes out of the Body in *Infants*, makes the Women miſtake ſuch Children for that Sort of Monſters they call *Hermaphrodites*. Of this Sort,

I had

I had one brought to me upon another Occaſion, the *Clitoris* of which hung out of the Body ſo far, at about three Years old, that it reſembled very much a *Penis*; but it wanted the Perforation, and inſtead of that, juſt behind it, the Urine iſſued at a Hole, which was nothing elſe but a Corner of the *Rima*, the *Clitoris* filling all the reſt of the Orifice: ſo that the Parents miſtook it for a Boy, and as ſuch Chriſten'd it, and as ſuch eſteem'd it when it was brought to me. But the Neighbours, who had Notice of this Appearance, call'd it an *Hermaphrodite*.

The *Clitoris* conſiſts of two nervous or ſpongy Bodies, like thoſe of the *Penis*, which have their Origine from the lower Part of the *Os Pubis* on each Side, which coming together form the Body which is called the *Clitoris*; which, tho' it has no Perforation analagous to that of the *Penis*, yet has a *Septum* or membranous Partition, which runs all along between theſe two nervous Bodies, from the *Glans* to its Divarication at the *Os Pubis*, where they are called *Crura Clitoridis*, and are near three Times as long as the ordinary Trunk of the *Clitoris* it ſelf.

At the End of it is a *Glans*, reſembling in Proportion that of the *Penis*, except, as has been ſaid, the Perforation. This *Glans* is covered with a *Præputium*, form'd out of the inner Membrane of the *Labia*.

The *Clitoris* has a Pair of *Muſcles* ariſing from the *Oſſa Coxendicis*, and terminating in its *Crura*, and ſerving to erect the *Clitoris*. Some Authors aſcribe another Pair of *Muſcles* coming from the *Sphincter Ani*, which are by others thought only to be the *conſtrictores* Muſcles of the *Vagina*, and aſſiſt in hindering the Reflux of the Blood from the *Clitoris*, *&c. in Coitu.*

It has *Arteries* from the *Pudenda*, and its *Veins* return to the *Hypogaſtricks*. The *Nerves* come from the *Intercoſtals*, and run in pretty large Twigs along the Back of it. Hence it is that it appears ſo extreamly affected in the Act of Coition.

After the Blood-Veſſels and Nerves have entred with Branches to the *Clitoris*, they are partly ſpent in a cavernulous Subſtance, called by *De Graaf*, *Plexus Reticularis*, that encompaſſes the *Pudendum* immediately under the *Nympha*, to which they alſo ſend Branches. All theſe Parts being fill'd with Blood, do more adequately embrace the *Penis in Coitu*; and by their Intumeſcence they not only force out the Contents of the *Lacunæ*, or excretory Ducts of the *Proſtratæ*, or *Corpus Glanduloſum*, in the Neck of the Bladder, but by excluding the external Air, the *Semen Maſculinum* is injected to the *Fundus Uteri*, and *Fallopian Tubes*; and that more eſpecially, if we conſider that the *Parietes* of thoſe Parts are furniſh'd with a vaſt Number of Blood-Veſſels, eſpecially Veins, and on their Intumeſcence, that the internal Air muſt be rarified in thoſe Cavities, by which Means the *Semen Maſculinum* paſſes to the *Ovaria*.

The *Nymphæ*, or *Alæ*, are ſoft, ſpongy, red Bodies, deſcending from the Top of the *Clitoris*, (to which they firmly adhere) to the Sides of the *Meatus Urinarius*, thereby reaching to about the Middle of the Orifice of the *Vagina*, where growing inſenſibly leſs and leſs, they diſappear: So that their Length may be accounted, from the *Clitoris* to the middle of the Orifice of the *Vagina*. Their Breadth is very uncertain, but in Maids uſually about that of half a Finger. They are ſometimes found much larger, and are capable of being diſtended to a great Degree, ſo as to hang a good Way out of the Body; and in ſome, theſe, as well as the *Clitoris*, have been forced to be cut.

Their Figure, taken together, is a kind of Half-oval. Their Subſtance is ſoft and ſpongy, compoſed of Membranes and Veſſels looſely cohering, and therefore eaſily diſtendible.

The Uſe of them is, by Swelling in the Act of Coition, to embrace the *Penis*, and by their Senſibility to affect the Woman, and mutually to invite to Procreation. They have their Blood-Veſſels and Nerves in common with the *Clitoris*.

Juſt behind the *Nymphæ* is the Orifice of the *Vagina*, which in Virgins, eſpecially ſuch as have not yet had the *Catamenia*, or but very rarely, is very ſtreight; but in thoſe that have had them oftener it grows larger, but more in married Women, and moſt in thoſe that have had Children.

Juſt above the *Orifice* of the *Vagina*, is the *Orifice* of the *Urethra*, opening with a little Intumeſcence. It is externally covered with a whitiſh Subſtance, which is partly glandulous and partly membranous, out of which

which iſſues a glutinous limpid Matter, through certain Ducts, which comes from the inward Part of the *Meatus*, and ſerves to anoint the Extremity of the *Urethra*.

In the Diſſection of theſe Parts, nothing has more exercis'd the Curioſity of Anatomiſts than the *Hymen*, who not only differ and contend about the Figure, Subſtance, Place and Perforations of it, but even about the Exiſtence it ſelf, which ſome poſitively affirm, others as flatly deny: And even *De Graaf* himſelf, the moſt induſtrious and accurate Inquirer into theſe Parts, confeſſes that he always ſought it in vain, tho' in divers Subjects, and in various unſuſpected Ages. All that he could find, was a different Straitneſs, and different Corrugations, which were greater or leſs, according to the reſpective Ages: The Younger they were, the *Foramen* being the ſtraiter, and the Rugoſities the greater, the former the neceſſary Conſequences of the latter. For as in Time the Parts grew, the Membranes were extended, and ſo the Surface of them grew gradually more ſmooth and plain.

Whether it is to be found in all Subjects I dare not affirm, but in thoſe few which I have had Opportunity to examine, I do not remember to have miſs'd it in any Subject where I had juſt Reaſon to depend upon finding it, if it were conſtant. The faireſt View which I ever had of it, was in a Maid who died at about Thirty Years of Age.

In Infants, it appears to be a fine thin Membrane, not very conſpicuous, becauſe of the natural Straitneſs of the Paſſage it ſelf, and of the *Foramen*, which, tho' very ſmall, did not allow of any great Expanſion in ſo little Room, and conſequently might appear to *De Graaf* a Corrugation only of the inner Membrane. But in this Subject we found it to be a Membrane of ſome Strength, furniſh'd with carnous Fibres, in Figure round, and perforated in the Middle with a ſmall Hole, capable of admitting the End of a Woman's little Finger, ſituate a little above the Orifice of the *Meatus Urinarius*, at the Entrance of the *Vagina*.

It is probable that this Membrane, as moſt others do, grows more diſtinct, as well as firm, by Age: And that it is ſometimes very ſtrong and impervious, may be collected from the Hiſtory of a Caſe reported by that skilful Anatomiſt Mr. *Cowper*, in his *Explications* of the *Fifty firſt Table of* Bidloo's *Anatomy*. *I was called* (ſays he) *to a marri... Woman of above Twenty Years of Age, who... lower Belly was diſtended as if with Child. Up... on examining the* Pudendum, *we found the Hy... men altogether impervious, and driven out be... yond the* Labia Pudendi, *in ſuch Manner, th... at firſt Sight it appeared not unlike a* Prolapſus Uteri. *In the upper Part, towards the* Clitoris, *we found the Orifice of the* Meatus Urinarius *very open, and its Sides extruded, not un... like the* Anus *or* Cloaca *of a Cock, and witho... any Difficulty I could put my fore Finger into th... Bladder of Urine. On dividing the* Hymen *at leaſt a Gallon of grumous Blood, of divers Co... lours and Conſiſtencies, came from her, which w... the retain'd* Menſtrua. *The next Day no le... Quantity of the ſame Matter flow'd, after r... moving the Peſſary which I had put in the D... before. After three or four Days ſhe was ea... and ſoon after recovered, and within a Year w... delivered of a healthful Child. Her Husba... told us, tho' lying with her at firſt was ve... painful to himſelf as well as her, yet at laſt... had a more eaſy Acceſs, which could be no o... Way than by the* Meatus Urinarius.

This Hiſtory proves, that this Membra... is not only a ſtrong Membrane, which cou... make Reſiſtance to that Force, which ov... came the *Meatus Urinarius*, and *Sphincter*... the *Bladder* which is conſiderably ſtrong... but by admitting of ſo great a Dilatatio... as to hang *extra Pudendum*, ſhews that t... Structure of it is fibrous, and conſequent... capable of great Diſtentions.

Whether this Membrane be always to... found in unvitiated Subjects, is more tha... can pretend to determine. The Scarcity... them in Adult, will not let me preſume... decide upon my own Obſervation, and mu... leſs can I do it upon any Agreement... Authors, among whom I find ſome, w... are moſt accurate, doubtful about its E... ſtence.

Adjoining, or rather in the Place of t... *Hymen* in Adults, in whom it is not fou... are four little *Caruncles*, or *Fleſhy Knots*, abo... the Bigneſs of *Myrtle-Berries*, from wh... they are called *Myrtiformes*, which ſome ſu... poſe to be largeſt in Maids, and by Deg... to grow leſs through the Uſe of *Ven*... Others, with more Probability, in...

pinion, derive them from the broken embrane of the *Hymen*, whoſe Fragments runk up they take them to be. Which of eſe is in the Right, I am not able poſitive- to ſay, having yet never ſeen them, where e Uſe of *Venery* had not preceded.

The *Moſaical* Teſt of *Virginity* has occa- oned abundance of Speculation about theſe rts, concerning which, the niceſt Inquiries n ſettle nothing certain. Whatever might depended upon among the *Jews*, in theſe ountries there may not be the ſame Reaſon expect thoſe *Tokens* of Virginity, tho' not all to be ſuſpected. For, beſides that they arried extreamly young, as it is the Cuſtom all *Eaſtern* Countries ſo to do, (whether *Hymen* be conſtantly to be expected or not) ere are many Circumſtances which may ſappoint ſuch Expectations, even in Vir- ns not vitiated by any Male Contact, or antonneſs of their own. For, whatever ay be the Caſe of thoſe Countries, in theſe orthern Climates, the Inclemency of the r expoſes them to ſuch Checks of Perſpi- tion, as give a great Turn to the Courſe of e Humours, and drives ſo much Humidity rough thoſe Parts, as may extraordinarily pple and relax thoſe Membranes from hich the Reſiſtance is expected, and from hich, in hotter Countries, it might more ſonably have been depended upon. Not t that thoſe Marks are ordinarily found re, but in ſome that have liv'd long Vir- ns, or are of very delicate Conſtitutions, long Courſe, or extraordinary Turn of umours that Way, may render Men un- ſly ſuſpicious, where no real Occaſion is ven. For in ſome, who preſerve their rginities a great while, and in others, om a delicate Conſtitution expoſes to a ng or great Courſe of Humours through oſe Parts, ſuch a Relaxation may be occa- ned, as may deceive and offend thoſe Men o expect certain Marks of Virginity, pecially where a *Hymen* is wanting, which r any Thing that appears to me) may be ſs'd oftner than it is found.

But even ſuppoſing a *Hymen* whole and broken, that, and the Membranes of the *gina*, may be ſo relax'd, through a long d great Courſe of the *Catamenia*, or from morbid Dripping of the *Fluor Albus*, t the pureſt Virgin may not be able to an- ſwer here Mens Expectations from the *Moſaical Teſt*, whatever might be juſt in thoſe hot Countries.

All that is certain in this Caſe, is, that they who have plainly the *Moſaical* Signs of Viginity, cannot be ſuſpected; the others may, tho' perhaps unjuſtly. There are other Accidents that may diſappoint theſe Expectations of Virginity, without any Treſpaſs on the Womans Part, which, without a Hiſtory of the Diſeaſes of thoſe Parts, (which it is not our Intention to give here) it is improper to enumerate.

The *Meatus Urinarius* in Women is very ſhort: It is lin'd internally with a very thin Membrane, and next to that is a Coat of a white Subſtance, of which an Account is given in the Deſcription of the Orifice. Through this Coat, from ſome *Lacunæ* in it, thoſe Ducts paſs which convey the Liquor ſpoken of before in the Account of the Orifice. It is very dilatable, as the Practice of Extraction of Stones, (of extraordinary Size) without Cutting, proves; as well as the Hiſtory before recited under the *Hymen*.

The *Vagina* of the *Uterus* is a membranous Part, reaching from the *Rima* juſt above the *Labia*, to the Neck of the *Uterus*. It lies upon the *Inteſtinum Rectum*, to which it firmly adheres, and under the *Veſica Urinaria*. It is reckon'd to be ſeven or eight Inches long.

The inward Subſtance of it is nervous, and exquiſitely ſenſile: The outward membranous, and of a looſe Texture, with carnous Fibres running longitudinally upon it.

At the Orifice it is much narrower than elſewhere, particularly in Virgins, eſpecially very young ones. Thro' the whole Courſe of it, it appears to be wrinkled, eſpecially on the upper internal Surface. The Uſe of *Venery* renders theſe *Rugæ* leſs apparent, and frequent *Parturition* almoſt obliterates them; which ſhews that they were contriv'd to render the Part more eaſily diſtendible for *Parturition*.

Along the whole Tract of the *Vagina*, there are a great many Pores, or *Oſtia*, or *little Ducts*, to be ſeen, which, in Acts of *Venery*, emit a Liquor that has been by many miſtaken for *Seed*, and are found in greateſt

greateſt Plenty about the lower Part of it, eſpecially about the *Exitus* of the *Meatus Urinarius*.

The *Vagina* has likewiſe a *Conſtrictory* Muſcle inſerted under the *Clitoris*, which, with a broad Series of Fibres, embraces and conſtringes the lower Part of the *Vagina*, ſpoken of before.

The *Uterus*, or *Matrix*, is ſituated in the *Pelvis* of the *Hypogaſtrium*, between the *Inteſtinum Rectum* and the *Urinary Bladder*. It is ſurrounded and defended by mighty Bones, before by the *Oſſa Pubis*, behind by the *Os Sacrum*, on each Side by the *Os Ilium* and *Iſchium*. It is in Figure ſomething like a flat Flask, or a dried Pear. In Women that are with Child, it receives different Forms, according to the different Times and Circumſtances of *Geſtation*.

In Maids, and Old Women long paſt their *Menſes*, it is pretty near of a Size. It is divided by Anatomiſts, as all other Cavities of this Kind are, into the *Fundus* and *Cervix*; a broad Part, and a Neck: And is in Extent, from the Extremity of one to that of the other, about three Inches in Length. Its Breadth at the *Fundus* is about two and a half, and its Thickneſs two.

It has but one Cavity, unleſs we make a Diſtinction between the Cavity of the *Uterus*, and that of its *Cervix* or Neck. That of the *Fundus* is very ſmall, ſcarce ſufficient to contain a Garden-Bean. At the Bottom, or Neck, it grows exceſſive narrow in Virgins, unleſs at the Time of Purgation, ſcarce wide enough to admit a *Crow's Quill*: The Extremity of which Paſſage, is called the *Oſculum internum*. In pregnant Women it opens, more eſpecially towards the Time of Delivery. But to obviate the Inconveniencies that might happen by the Womb's remaining open, it is, as it were, ſealed up with a Sort of glutinous Matter, that iſſues from the Glands about it.

The lower *Orifice* of the *Neck*, looking towards the *Vagina*, is a little prominent, and reſembles, in ſome Meaſure, the *Glans* of the *Virile Organ*. The Subſtance of it appears to be very firm and compact, yet is nevertheleſs dilatable to a great Degree, as appears by the Excluſion of a full grown *Fœtus*.

The *Subſtance* of the *Uterus* is membranous and carnous. It conſiſts of three *Tunics*, according to ſome, who deny that Name to the middle Subſtance, of two only.

The *External Tunic*, which is called the *Communis*, is derived from the *Peritonæum*. This conſiſts of two *Lamellæ*, and is pretty thick and ſtrong. The exterior of theſe is ſmooth, the interior ſomewhat rugged and uneven, through the Connexion of the ſubjacent Parts. This Membrane inveſts the whole Womb, and connects it to the *Inteſtinum Rectum*, Bladder of Urine, and other adjacent Parts.

The *Middle Tunic* is very thick, and compoſed of thick ſtrong Fibres variouſly diſpoſed. It ſeems to be muſcular, and by ſome thought to contribute to the Excluſion of the *Fœtus*, and other Contents of the Womb: Though, in my Opinion, that is not the Office of it, and this, as the muſcular Membranes of other Parts, ſerves only to recover the Tone after any violent Diſtention.

The *Inner Tunic* is nervous. It is thin and in the *Fundus Uteri* ſmooth, but in and about the *Neck* very much wrinkled, and pierc'd with Abundance of little Holes like the Mouths of Ducts, out of which upon preſſing, iſſues a clear, ropy Liquor which probably is that which ſeals up the Mouth of the Womb in the Time of *Geſtation*.

The *Uterus* is *connected* by its Neck to the *Vagina*, behind by its outward common Membrane, and before by the ſame to the *Veſica Urinaria*. Its Sides are tied to other Parts, but the *Fundus* of it is left looſe, that it may expand and dilate with more Freedom according to particular Exigencies.

The *Ligaments* are in Number four, two of them called the *Broad Ligaments*, and two *Round*, from their Figure.

The *Broad Ligaments* are membranous and ariſe from the *Proceſſus* of the *Peritonæum*, from which they branch off about the Loins and are faſten'd to the Sides of the *Uterus* and *Vagina*, and ſerve to prevent their falling down. They contribute likewiſe towards the ſuſtaining the *Ovaria*, the *Tubæ Fallopianæ*, and other Veſſels, which they as it were embrace.

The *Round Ligaments* ariſe from the Sides of the Womb, at the Place where the *Tubæ Fallopianæ* are join'd to it. At their firſt Riſe they likewiſe are broad, but by Degrees, as they recede farther from the Womb, they grow round and ſmooth. And as the Spermatick Veſſels do in Men paſs betwixt the Duplicature of the *Peritonæum*, and ſo out of the *Abdomen* through the *Foramina* of the Oblique and tranſverſe Muſcles of the *Abdomen*, then running obliquely upon the *Os Pubis*, they there terminate under the Fat near the *Clitoris*. By the Paſſages of theſe Ligaments, Women and Girls eſpecially are expoſed to inguinal Ruptures, as Men are by the Paſſages of the Spermatick Veſſels.

The *Subſtance* of the *Broad Ligaments* is Membranous, looſe and ſoft, whence they have been compared by ſome to the Wings of *Bats*, and call'd *Alæ Veſpertilionum*; and from the Intertexture of ſome Fibres, others have miſtakenly fancied them to be *Muſcles*. After hard Labour, and a forc'd Delivery, theſe Ligaments are ſometimes over-ſtrain'd ſo far, as not to recover their Tone, whence follows a Propendence at the *Pudendum*, which is term'd *Prolapſus Uteri*. But whether properly ſo called, and that Appearance be a real *Prolapſus* of the *Uterus*, or only a Dilatation and Propendence of the *Vagina* only, as ſome would have it, is an Enquiry not of this Place.

The *Round Ligaments* are of a firmer Texture, and conſiſt of a double Membrane, wrapping up in it *Arteries*, *Veins*, *Nerves* and *Lymphæducts*, intermix'd with fleſhy Fibres, whence ſome have mikaken theſe alſo for Muſcles. The Blood-Veſſels and Nerves, both in theſe and the broad Ligaments, are numerous, and make up a great Part of what is call'd their Subſtance. Theſe, as the others, ſerve to keep the Womb in its right Poſition, and are capable of being injured, by the Violence of Unskilful Midwives, in haſty forc'd Deliveries.

By theſe Ligaments the *Uterus* is kept ſo right in its proper Situation, that no Violence of internal *Flatus* or Humors can raiſe it above its Place. For as *De Graef* obſerves, a Man pulling with both Hands, with all his Strength, cannot raiſe it above the *Os Sacrum*. This makes appear the Vanity of that Opinion which ſome have maintain'd after the great *Hippocrates*; that in *Hyſterick Paſſions*, as they are improperly call'd, the *Uterus* riſes, and preſſing on the *Stomach* and *Diaphragm*, cauſes that Senſe of *Suffocation* which Women feel in ſuch Affections: An Error pardonable in the Times of that great Philoſopher, when Anatomy was but rude, but not to be forgiven in Modern Phyſicians, who have the Means of knowing, at the Expence of others Labour, (if they would take the Pains to read) the Abſurdity and Impoſſibility of that Notion.

On each Side of the *Fundus* of the Womb ariſes a *Duct*, which opens into the Womb with a very ſmall Orifice, ſcarce admitting a ſmall Stile, or a Knitting-Needle, but in its Progreſs its Capacity grows greater, being large enough to admit the End of a Man's little Finger, and towards the End is contracted, and grows ſmall again. At the End next the *Ovaria*, which is at Liberty, it is again expanded into a Sort of *Foliage*, which is fringed round with innumerable little Fibres, like a ragged Fringe, which Expanſion, when opened, was thought, by *Fallopius* the firſt Deſcriber, to reſemble the End of a Trumpet, and therefore the whole Duct was by him nam'd *Tuba*.

It conſiſts of a double *Membrane*, the outward ſmooth and even, deriv'd from the common Membrane of the *Uterus*. The inner, which ſprings from the inner Membrane of the Womb, is very much corrugated, more eſpecially at the Extremities. That fartheſt from the Womb at the Time of Impregnation, at which Time the whole *Tube* is expanded, reaches to and embraces the *Ovary*: At other Times it ſeems to fall a little ſhort of it, and is only ſlightly tied by a thin Membrane, reaching from the under Part of the *Expanſum Foliaceum* to the under Side of the *Ovary*. Theſe *Tubes* are about five or ſix Fingers Breadth long.

Both *Arteries* and *Veins* are very numerous here, eſpecially the latter, which by their Ramifications and Contortions make the main Subſtance of them, which is a Kind of *Reticular* or *Cavernous* Body, conſiſting

ſiſting almoſt wholly of Blood-Veſſels, not unlike that of the *Pudendum*, or *Clitoris*, before deſcrib'd. This Structure makes it capable of Dilatation and Contraction, according to the Quantity and Stop of the irruent Blood, and conſequently of being erected (if I may uſe that Term) *in Coitu*, and of embracing the *Ovarium* at that Time, which in its State of Flaccidity it did not reach.

Doctor *Wharton* has aſcrib'd *Valves* to them, and others have divided them into *Cells*; but tho' both are to be found in the *Cornua Uteri* of ſome Brutes, they are not to be met with in the *Tubes* of Women, which have but one Cavity a little dilated in the Middle, and no *Valves*.

Near the Ends of theſe *Tubes*, about two Fingers Diſtance from the *Uterus*, lie the *Ovaries*, or *Teſtes Muliebres*, ſo called from their Uſe, which was formerly ſuppoſed to be analogous to that of the Teſticles in Men.

They are connected to the Womb by a ſtrong Ligament, called by many Anatomiſts *Vas Deferens*, upon Suppoſition that it was a Veſſel which convey'd the Seed to the Womb, and in ſome Meaſure likewiſe by the *Tubæ Fallopianæ*, and by the *Broad Ligament*. About the Region of the *Os Ilium*, they are faſten'd to the *Peritonæum* by Means of the Spermatick Veſſels, and the Membranes which cover them, by all which the *Ovaries* are kept ſuſpended about the ſame Height with the *Fundus Uteri* in Women not pregnant. In Pregnants they riſe along with the *Uterus*, but not quite ſo high as that does in the laſt Months of Geſtation.

Their *Figure* is not ſo round as the Male *Teſtes*, but is a Kind of Semi-oval, gibbous on one Side, and depreſs'd on the other, with a Superficies ſomething uneven, through the unequal Protuberance of the *Ova* which they contain.

They are of different *Magnitudes* in the different Stages of Life. At the Time of *Puberty*, when they are at their largeſt, they weigh ordinarily about a Dram and an half, and are about half the Bigneſs of a Man's Teſticle. In the Flower of Age they are plump and ſucculent, but as Age comes on, they wither and ſhrink by Degrees, and grow hard and dry, ſo as ſometimes at laſt to weigh not above a Scruple. Some Anatomiſts have affirm'd, that theſe, as glandulous Parts, like the *Thymus*, were bigger in Infants, and decreaſe gradually after Birth; but *De Graef*, who weigh'd many of those of new-born Children, ſays, he never found them weigh otherwiſe than between five and ten Grains.

They are covered externally with a common *Membrane* from the *Peritonæum*, to which ſome add a proper *Membrane*.

The Membrane being taken away, the *Subſtance* appears whitiſh, compoſed of a Multitude of thin little Membranes, and ſlender Fibres, interwoven with a great Number of *Arteries*, *Veins* and *Nerves*.

Among theſe Fibres, Membranes and Veſſels, are found interſpers'd a Number of little round Bodies, like Bladders, full of a limpid Subſtance like the White of an Egg, which boil'd acquire the ſame Colour, Taſte and Conſiſtence, with a boil'd White of an Egg, from which Similitude, as well as from the Analogy of their Uſe, (being taken for the material Principle of Generation) they are now commonly called *Ova* or Eggs, and the *Teſtes* in which they are contain'd *Ovaries*.

Theſe *Eggs* are of very different *Magnitudes* in the ſame *Ovary*, though the biggeſt in a Woman ſeldom equals the Size of a White Pea. They are ſo numerous, that *De Graaf* has told above twenty in one *Ovary*. Theſe Eggs have been found by Anatomiſts in the *Ovaries* of almoſt all Sorts of Animals, and are not doubted to exiſt in the Females of all Sorts of Animals whatſoever.

Beſides theſe Eggs, there are ſometimes found another Sort of watry Bladders which are ſuppos'd to be preternatural in that Situation, becauſe they are found but now and then, and ſometimes even bigger than the *Eggs* themſelves. They are called *Hydatides*, and are probably the firſt Beginning of a *Dropſy*, commenced in this Part by the *Eggs*, and perhaps are no other than the *Hydropical Eggs* themſelves.

It is not unlikely, that all thoſe *Dropſies* f the Belly which Women labour with un- er the fallacious Name of *Tympanies*, have heir firſt Riſe in theſe Parts. I have been reſent at the opening of ſeveral, and have lways found the *Ovaria* diſtended with Vater to an incredible Magnitude (though ot always equally on either Side) but ſpecially in one, when a Gallon or more f Water was taken out of one *Teſticle*, and he Membranes of the *Teſticles*, after the Vater was taken out, ſo enlarg'd and hicken'd, that it appeared by Hand to eigh ſome Pounds, but not having eigh'd it in *Scales*, we cannot tell the ex- t Weight of it.

The *Blood-Veſſels* that go to the *Uterus*, nd the appending Parts, are divided into uperior and Inferior. The *Superior* are the me that are call'd in Men the *Spermatica*, d *Vaſa Præparantia*, and have their Ori- nes from, and *Exit* into, the *Aorta* and *va*, as the Veſſels of Men have; but ot being ſent out of the *Abdomen*, their ourſe is ſhorter. The Branches which ey diſtribute into the *Uterus* and *Vagi-* , are larger, and more in Number, than oſe that go to the *Tubæ Falliopanæ* and *aria*.

The *Inferior* are Branches of the *Hypo- ricks* and *Hæmorrhoidals*, and only ſcat- ter themſelves upon the lower Part of the *Vagina*. Thoſe before-mentioned are pretty large, and are diſtributed all over the *Vagina* and *Uterus*, running after an irregular Manner with abundance of Contortions, and joining very apparently by perfect *Anaſtomoſes*, *Arteries* with *Arteries*, and *Veins* with *Veins*, as blowing into them, or Injections with any Liquor ſhew, eſpecially the Injections of Wax.

But in the Times of Geſtation theſe Veſſels grow very large, and plainly ſhew, even without Injection, their Communication; ſome of them being large enough to admit of a Swan's Quill.

They receive *Nerves* from the *Par Vagum*, and from the *Cauda Equina* in the *Os Sacrum*.

Monſieur *Nuck* has given us an accurate Deſcription of the *Lymphæducts* of *the Ovaria*, in his *Adenographia Curioſa & Uteri Fœminei Anatome Nova*: They ariſe from the Surface of the *Ovaria* by ſeveral Branches, which unite and make three Branches on each Side, and partly empty themſelves into the *Lymphatick Glands* below the *Emulgent Veſſels*, whence other exporting *Lymphæducts* ariſe, and empty themſelves into the *Receptaculum Chyli*: Others empty themſelves immediately into the *Receptaculum*.

Of the Placenta Uterina, *the* Umbilical Veſſels, *the* Membranes *that involve the* Fœtus, *and the* Liquors *that they contain*; *the* Situation *of the* Fœtus *in the* Womb, *the* Legitimate Time, *the* Nouriſhment *of the* Fœtus, *the Difference between a* Fœtus *before* Birth *and after.*

AFTER *Impregnation*, there is a new Production of Parts, that exiſt only during the Time of *Geſtation*, and afterwards are either diſcharged, or dry up and diſappear.

Of theſe, the *Principal* is the *Fœtus*, for the Sake and Uſe of which all the reſt are form'd. But of that more hereafter.

After the *Fœtus*, the moſt conſiderable for Bulk and Figure is the *Placenta*, by ancient Anatomiſts called *Hepar Uterinum*, for Reaſons which, ſince the Diſcovery of the *Circulation* of the Blood, are out of Date. It is ſomething in Figure like a Plate without Brims, about three quarters of a Foot over, ſometimes a Foot. It is round generally, of a Figure *Concave Convex*. The Concave Side adheres to the *Uterus*, and is uneven, with divers Protuberances and Pits, by which it made Impreſſions on, and received 'em from the *Uterus*. The Place of it in the *Uterus*, whatever ſome pretend, is not certain.

In *Women*, unleſs in caſe of *Twins*, or more, there is but one: However the Number generally anſwers the Number of the *Fœtus*. In ſome Brutes, eſpecially in *Oxen* or *Sheep*, they are very numerous, ſometimes near an Hundred, even for one *Fœtus*, ſmall, and reſemble pretty large conglomerate Glands.

From the external or concave Side, which likewiſe has its Protuberances, though covered with a ſmooth Membrane, iſſue the *Umbilical Veſſels*, which are in great Plenty diſtributed through the whole Subſtance of it.

The *Umbilical Veſſels* are, two *Arteries*, a *Vein*, and the *Urachus*.

The *Arteries* ariſe from the *Iliacks*, generally near their Diviſion into External and Internal, and thence paſs on each Side of the *Urinary* Bladder, through the *Navel*, to the *Placenta*.

The *Umbilical Vein*, from innumerable Capillars united into one Trunk, deſcends from the *Placenta* to the Liver of the *Fœtus*, where it is partly diſtributed into the *Porta*, and partly into the *Cava*. The Trunk of this *Vein*, anſwerable to the Occaſion, is above double the Capacity of either *Artery*. It is ſometimes divided before it comes at the *Fœtus* into two Branches, and united again within.

The *Arteries* have in ſeveral Places Contortions or Convolutions, which form a Sort of Knots, by the Number of which our *Midwives* ſuperſtitiouſly reckon the Number of Children the Woman is to have.

Among theſe *Umbilical Veſſels* may be reckon'd the *Urachus*, which, tho' not plainly found, except in *Brutes*, where it is indiſputable, is in my Opinion however reaſonably to be allow'd, though our Opportunities of Examination not being the ſame, it uſually collapſes, and grows ſo ſtiff before ſuch Subjects come under our Examination, that we have not a fair Trial: But the Neceſſity appearing to be the ſame, I can little more doubt the Exiſtence of it than in *Brutes*, where it is exhibited beyond Contradiction.

To

To theſe Veſſels are continued the *Membranes* which include the *Fœtus*, the interior of which including the *Fœtus*, and the Liquor wherein it lies, is called *Amnios*, which is a white, ſoft, thin, tranſparent Membrane, containing in it a limpid Liquor, like a thin Gelly Broth; of which the Stomach of the *Fœtus* being always found full, it is probably, in Part at leaſt, the Matter of its Nouriſhment.

On the out Side of this is found a thin Humour, that in Conſiſtence and other Circumſtances reſembles Urine, which, according to Dr. *Needham*, is contain'd in a proper *Membrane*, which he calls *Membrana Urinaria*, and receives the Diſcharge of that Liquor from the *Urachus*. But Subjects proper for an Examination of this particular being rare, Anatomiſts have doubted the Exiſtence of this Membrane, and have choſen rather to make it a Duplicature only of the *Chorion*, and to leave the Liquor which it contains (which is no ſmall Quantity) unaccounted for, than to allow any Thing analogous to the *Allantois* in Cows and Sheep, though the Neceſſity appears to be the ſame. For this they give no other Reaſon, than that the *Urachus* of a Humane *Fœtus* is not permeable by the *Flatus*, and that the Membrane, which Dr. *Needham* calls *Urinaria*, adheres in ſome Places pretty cloſely to the *Chorion*. The firſt of which may happen generally, becauſe ſuch Subiects are not expoſed Time enough to them to make a fair Inquiry. The latter carries no Weight at all with it.

The outward *Membrane* of the *Chorion* is a pretty thick, ſtrong, whitiſh Membrane, cover'd with a Multitude of Branches of Veins and Arteries. It is diviſible into two *Lamellæ*, whereof the outermoſt is thick and opaque, the inner thin and tranſparent. Thoſe that deny the *Urinary Membrane*, divide it into three, the innermoſt of which is as the outer, likewiſe pretty thick, contrary to the common Courſe of Nature, which is ſome Argument for its being a diſtinct Membrane.

Some Anatomiſts have pretended to give an Account of the Poſture of the *Fœtus* in the Womb at the ſeveral Times of Geſtation. But theſe are ſo very various and uncertain, that ſuch Accounts are little to be depended upon. In the firſt Months, it is of no Moment how it lies in the Womb. In the latter Months, after the *Fœtus* is grown not only quick, but robuſt, it frequently changes its Poſtures of it ſelf, as not only the Mothers themſelves feel, but any Body, by laying their Hands upon their Bellies, frequently may. However, their ordinary Poſture is accounted to be Sitting, with the Head uppermoſt, the Knees brought up between the Elbows, the Feet drawn back towards the Buttocks, the Hands cloſed below the Knees, and the Head dropping, with the Noſe, as it were, between the Knees.

When the Time of *Birth* draws very near, it generally turns it ſelf, and, preſerving as to the reſt near the ſame Poſture, preſents the Head to the *Os Uteri*, which is the moſt eaſy and natural Poſture for *Delivery*. When the *Midwives* find it thus offering, they ſay it lies right. Sometimes it preſents the *Feet* firſt, and this Way Women are delivered, but with great Difficulty and Pain. Sometimes likewiſe it lies a-croſs, offering either a *Hand*, a *Foot*, a *Knee*, or an *Elbow*; and this Way *Delivery* is impracticable; and unleſs the *Midwife* has the Addreſs and Skill to turn it, as they boaſt that they do ſometimes, either Mother or Child, or both, muſt be loſt. In this deplorable Caſe, the Life of the Mother is generally preferr'd to that of the Child, and the Child, by Means of Inſtruments, has been brought away by Piece-meal.

Sometimes the Child dies in the Womb, which if not timely diſcover'd, and brought away, the Mother runs great Hazard. This Sort of *Births* is not inconſiſtent with the Safety of the Mother. *Bartholin*, in a Book *De Inſolitis Partus Viis*, relates a great many ſtupendious Caſes of Children dead and putrified in the Womb, the Parts of which have made their Way through *Apoſtemations*, one whereof at the *Navel* was ſome Years in coming away, ſome Bones being diſcharged at long diſtant Times, and making up in all, as he judges, ſufficient for the *Skeleton* of *Twins*.

Something like this happen'd to a *Gentlewoman* of my Acquaintance, who receiving a great Fright after ſhe was twenty Weeks gone with *Twins*, found her Belly inſenſibly

to

to begin to ſink on one Side, and at length to grow very cold, flaccid, and flat, whilſt the other Side continued to ſwell and increaſe till the due Time of Delivery, when ſhe was delivered of a live Child. With it came away abundance of fœtid, putrified, black and other coloured Matter, mix'd with the Bones of a Child, which died at the Time of that Fright, and remain'd corrupting in the Womb till the Time of Delivery. The *Placenta* of the Child which was born alive was very black, diſcoloured, and in ſome Meaſure putrefied likewiſe. The Child however grew up to be a Woman, and is now alive and bears Children, but has been from her Cradle obnoxious to *Scrofulous Tumors*, *Ulcerations*, *Cutaneous Eruptions*, and *Swellings*. It is probable the Infirmity to which this *Gentlewoman* is obnoxious, is owing to a Taint received from that unhappy *Bedfellow* in the Womb.

It happens ſometimes likewiſe that the Mother dies, the Child yet living and vigorous in the Womb. In this Caſe, without Scruple or Delay, the Womb is to be cut open, by which Means the Life of many Children has been ſaved, and ſome not yet come to Maturity for a *Natural Birth*. This Way our *Edward the Sixth* was brought into the World, and *Julius Cæſar*, from whom it has been ever ſince called *Partus Cæſareus*.

The *Legitimate Time* of the *Birth* has been much controverted, though common Obſervation ſhews it to be about Forty Weeks from the *Time* of *Impregnation*; and though very frequent Inſtances of thoſe that go longer, or come ſooner, are pretended, yet I believe this to proceed rather from the miſtaken Accounts of the Women themſelves, than from any Variation in Nature. We do indeed not only read of, but frequently ſee, Births of *Seven* and *Eight* Months, but theſe may be reckon'd among the untimely *Deliveries*, and the Child is ſeldom or never Mature, if there has been no Fallacy in the Reckoning. All Creatures have a ſtated Period for bringing their Young into the World at Maturity, and why it ſhould be otherwiſe in Women, no Reaſon appears.

How the *Fœtus* is nouriſh'd in the Womb, has been a Queſtion as much agitated among Anatomiſts as any whatſoever. Some contend that it is nouriſh'd by the Mouth, others will have it to receive its Increaſe, and to grow like a *Vegetable* from the Mother, from the Root, of which the *Umbilical Veſſels* are the Stem, and the Child the Head or Fruit of this *Plant-Animal*, if I may uſe that Expreſſion. But this Queſtion, and ſome others, we ſhall wave here, as containing ſomething of curious Argument and deſerving a more particular Diſcuſſion.

There are ſome *Differences* in the *Structure*, *Mechaniſm* and *Proportion* of the *Parts* of the *Fœtus*, from thoſe of an *Adult*, of which the Principal are thoſe about the *Umbilical Veſſels* and *Liver*, and thoſe about the *Heart* and *Lungs*. The moſt apparent of theſe, is the *Funiculus Umbilicalis*, which is a Part that at the Birth is either broken, or cut away to the *Navel*. Here are two *Arteries* and a *Vein* and *Urachus*, which, after Birth become perfectly uſeleſs as Veſſels, and drying, become impervious, and ſerve only as *Ligaments* to ſuſpend the *Liver*.

In the *Liver* it ſelf is the *Canalis Venoſus*, which in a *Fœtus* maintains a Communication between the *Porta* and *Cava*, but after Birth dries up by Degrees.

In and at the *Heart*, are the *Foramen Ovale* and *Canalis Arterioſus*, both which ſerve to maintain the *Circulation* of the Blood, and to divert it from the Lungs, which in a *Fœtus* are idle and uſeleſs, and of a darker Colour and cloſer Conſiſtence, than after they have been breath'd into, as appears by their ſwimming in Water after Birth, which they will not before do. This Difference in the Lungs affords an uſeful Experiment, in caſe of the ſuſpected *Murther* of *Children*, for if they were *Still-born*, the Lungs ſink in Water, if born alive, they ſwim. The afore-nam'd Channels ſerve only for the Uſe of a *Fœtus*, to prevent that Obſtruction the Blood would otherwiſe have within the Lungs before they have been open'd. After Breathing has open'd the Lungs, the Blood takes its Courſe through them, and theſe Paſſages cloſe up.

The *Head* is much bigger in Proportion to the reſt of the Body than afterwards; the Bones are ſofter, and the Sutures uncloſed, leaving a great Space on the Top of the Head, covered only with the Membrane which

hich is afterwards cloſed up with the ones.

The *Thymus* and *Glandulæ Renates* are conerably larger than afterwards, for it does t increaſe in Proportion to the Age of the rſon.

Moſt other Glands are likewiſe bigger and ſofter, as the Brain it ſelf is.

There are other Differences which are of no great Moment, and therefore not neceſſary to be mentioned here.

Of the Catamenia, *or* Menſes.

THE *Periodical Purgations* of Women not with Child, or giving Suck, is a *Phænomenon* that has exercis'd the ateſt Wits of the *Faculty*, who, after maearned Arguments, and many ingenious *potheſes*, have not been able to come to Agreement among themſelves.

All Authors agree, that the Neceſſity t Women have for ſome extraordinary pply, to recompence the Expence, and ſupport them under it, during the Time *Geſtation*, was the final Reaſon why Redundance at other Times was given them.

But this is the only Point wherein they generally agreed. Some not content with t Occaſion alone, will have the Menous Blood to offend in *Quality*, more n *Quantity*, which they argue from the n it gives many Women in the Evacua-. They ſay likewiſe, that the Malignity hem is ſo great, that they excoriate the s of Men by the meer Contact; that Breath of a Menſtruous Woman will a permanent Stain to Ivory, or a Look-glaſs; that a little of this Blood drop'd n a Vine, or Corn, or any other Vege-e, they become ſteril or blaſted; that if oman with Child be defil'd with the ſes of another Woman, ſhe miſcarries; if a Dog taſts them, he runs mad; if a n, he becomes epileptick; which, with ndance of other ſuch Fables, though reted by many grave, and ſome great hors, I reject, as needing no Refutation, have only recited them, to ſhew what ngs have been ſuperſtitiouſly taken up n Credit, without ſufficient Examination, Men of great Authority, who have been prevailed upon to believe, what the Women at all Times would laugh at. Another Thing likewiſe, which we ſhall not beſtow much Time upon, is, the ſuppoſed Dominion of the Moon over the Bodies of Women in this Caſe, a Fancy which antiently was the univerſal Opinion, though common Experience, with a very little Reflection, might have ſhewn the Weakneſs of it. For if this Purgation had been cauſed by any Influence of the Moon, then all Women of the ſame Age and Temperament ſhould be purg'd according to the ſame *Periods* and *Revolutions* of the *Moon* at the ſame Time, which daily Experience ſhews to be falſe.

There are two Opinions however, that are argued with a great deal of Strength and Reaſon, both which allow the Quality of the Blood to be innocent, but they differ about the Reaſon of its Iſſue. Doctor *Bohn*, and of late Dr. *Friend*, a learned ingenious Gentleman of *Oxford*, maintain that this *Flux* is the Reſult of a meer *Plethora*, and to be evacuated only for Relief againſt the Quantity.

Others are of Opinion, that this Evacuation is owing to a *Fermentation* rais'd at that Time, and that the Eruption of the Blood in thoſe Parts is the Effect of an Effervescence or Ebullition of the Blood. This Opinion has been maintain'd by many, but its chief Supporters are, the learned Doctor *Charleton* here, the ingenious Doctor *Bayle*, *Profeſſor* of *Phyſick* at *Tholouſe*, and Doctor *De Graef*, whom we have had ſo frequent Occaſion to mention.

The two firſt of theſe ſuppoſe a *Ferment* peculiar to the Women, which produces this *Flux*,

Flux, and affects that Part only, or at leaſt principally. *De Graef*, leſs particular in his Notion, only ſuppoſes an Effervescence of the Blood rais'd by ſome Ferment, without aſſigning how it acts, or what it is.

Dr. *Friend* (who has ſuſtain'd the Cauſe of a *Plethora* with the greateſt Clearneſs and Strength) ſuppoſes that this *Plethora* ariſes from a *Coacervation* in the Blood-Veſſels of a *Superfluity* of Aliment, which he thinks to remain over and above what is excreted by the ordinary Ways; and that Women have this *Plethora*, and not Men, becauſe their Bodies are more humid, and their Veſſels, eſpecially the Extremities of them, more ſlender, and their Manner of living generally more unactive than a Man's, and that theſe Things concurrring, are the Occaſion that Women do not perſpire ſufficiently to carry off the ſuperfluous Alimentary Parts, and that therefore this Overplus muſt be retain'd in the Veſſels, till it be accumulated in ſuch Quantity, as to diſtend the Veſſels, and force its Way through the *Capillary Arteries* of the *Uterus*. And he thinks this Diſcharge to happen in that Part, rather than in any other, becauſe it is more favoured by the Structure of the Veſſels, the Arteries being very numerous, and the Veins very ſinuous and winding, and therefore more apt to retard the *Impetus* of the Blood, and conſequently, in a *Plethorick* Caſe, to occaſion a Rupture of the Extremities of the Veſſels, which may laſt till by a ſufficient Diſcharge the Veſſels are eas'd of their Overload.

This I take to be the Subſtance of that *learned, ingenious Gentleman's Hypotheſis*, from whence he very *Mechanically*, and very *Philoſophically*, deduces a *Rationale* of the *Symptoms*.

To this *Hypotheſis* I could ſubſcribe, did not many Obſervations convince me, that there is no ſuch *Plethora*, or at leaſt that it is not neceſſary to *Menſtruation*; for if the *Menſes* were owing to a *Plethora* ſo accumulated, the *Symptoms* would ariſe gradually, and the Heavineſs, Stiffneſs and Inactivity, (neceſſary *Symptoms* of a *Plethora*) would be felt long before the *Abſolution* of the *Period*, and Women would begin to be heavy and indiſpoſed ſoon after their Evacuation, and the *Symptoms* would encreaſe Day by Day. But this is contrary to all Experience, and many Women, who have *them* regularly and eaſily, have no Warning, not other Rule to prevent an indecent Surprize, than the Meaſure of the Time; in which ſome that have ſlipped, though otherwiſe modeſt and careful Women, have been put to ſuch Confuſions and Shifts, as would not conſiſt with the Notice that a *Plethoric* Body would give.

But even in thoſe who are difficultly this Way purg'd, the *Symptoms*, tho' very vexatious and tedious, do not make ſuch regular Approaches, as a gradual Accumulation neceſſarily requires: If we conſider what violent Symptoms will come on in a Day, or an Hour, we ſhall be extremely puzzled to find out the mighty Acceſſion of Matter that ſhould in an Hour or Day's Time make ſuch great Alterations. According to this *Hypotheſis*, the *laſt* Day contributes no more than the *firſt*, and conſequently the Alteration ſhould be no more ſenſible, excepting the bare *Eruption*: But it is neither my Buſineſs nor Intention to combat any Man's Opinion. The learned Doctor *Bohn* has ſaid a great deal, and Dr. *Friend* has rendered this *Opinion* ſo plauſible, that I wiſh it were true; and muſt do him this Juſtice, that his is the firſt Account of the *Periodical* Revolution of the *Menſes* that I have met with Philoſophically contriv'd, and like an underſtanding *Inquirer*. Moſt others have either given trifling or precarious Solutions, or paſs'd it over as a Difficulty beyond Human Underſtanding.

The *other Hypotheſis*, of a Fermentation or Effervescence of the Blood, has had much worſe Luck: For either it has been ſlubber'd over as a Thing whereof the *Fact* was certain, but the Reaſon inſcrutable, as *De Graef* has left it; or eſtabliſh'd upon an *imaginary Ferment*, which never was proved to exiſt and perhaps never will be.

The ſudden *Turgeſcence* of the Blood gave them Reaſon to think, that it aroſe from ſomething till then *extraneous* to the Blood. But where to find that they did not know, and therefore had Recourſe to the Parts ſuppos'd to be principally affected, and feigned an imaginary Ferment, which no Anatomical Inquiry could ever ſhew, or affirm a reaſonable Receptacle for, nor no Reaſon

neceſſarily infer: But on the contrary, both *Autopſy*, and Reaſonings from it, conclude againſt it; ſince neither the fermenting Matter it ſelf, the Organs by which it ſhould be ſecreted, nor the Place where it ſhould be repoſited, are to be found.

However, the *Heat*, which accompanies the *Turgeſcence* of the Blood, ſhews that it is not meerly *Plethorical*, but that there is an extraordinary inteſtine Motion at that Time: Which is likewiſe confirm'd by the Operation of moſt Medicines conducing to that End, which are moſt of them ſuch as will give a *Fermentative* Motion to the Blood; or ſuch as will ſtop an extraordinary Flux of Humours another Way, which is one of the ordinary Cauſes of a Defect of the *Menſes*. For this Reaſon, *Vitriolick* and other *Reſtringent Medicines*, which are ſometimes given with Succeſs in Obſtructions, as they are called, are not ſtrictly to be reckoned among the *Provocants*, but to the Number of thoſe that, by rectifying the Tone of the Stomach and Inteſtines, ſtop extraordinary Fluxes that Way, and by Degrees mend and invigorate the Blood, which by ſuch Diſcharges is impoveriſh'd.

The Suddenneſs and Violence of the Effervescence, which is ſuch as to break out at the *Noſe*, *Hæmorrhoids*, *Lungs*, *Stomach*, *Eyes*, and indeed almoſt any Part of the Body, ſhews, that whatever is the Cauſe, it is ſomething very active, and that may be introduc'd in Quantity in a ſhort Time into the Blood; and conſequently, that it muſt be ready gathered in ſome Receptacle, where, while it was contain'd, its Action was prohibited. For, if it had been ſcatter'd in the Blood it ſelf, it muſt either have acted conſtantly and regularly, and then no ſuch *Critical* Evacuation could happen; or it muſt exert its Power gradually, according to its Increaſe in the Blood, and ſo the Symptoms muſt have approach'd in the ſame Manner as we have argued againſt a *Plethora*.

The only Humour which I can find in the Body, ſo circumſtantiated as this *Phænomenon* ſeems to require, is the *Bile* contain'd in the *Gall-Bladder*. This is a *Liquor* that probably may have divers Uſes, and produce many Effects in an Animal Body which are yet unobſerved: But univerſal Experience agrees, that it is capable of raiſing Diſorders, or *Fermentations extraordinary*, whenever it inſinuates it ſelf in Quantity into the Blood. And as it is contain'd in a peculiar Receptacle, which ſeems not to admit of a conſtant Iſſue, it may be there reſerv'd, till in a certain Period of Time the *Bladder* becoming turgent and full, through the Compreſſion of the incumbent *Viſcera*, it emits the *Gall*, which, by the Way of the *Lacteals*, inſinuating it ſelf into the Blood, may raiſe that *Effervescence*, which occaſions the *Aperture* of the *Uterine Arteries*.

All Obſervations agree, that Perſons of a *Bilious* Conſtitution are either more plentifully, or more frequently purged this Way; and I my ſelf have obſerv'd divers *Bilious* Perſons, who, tho' obnoxious to a *Fluxus alvi*, which kept them far from a *Plethorick* Condition, were however vex'd with a *Menſtruous Hypercatharſis*: And it is obſervable, that Men of *Bilious* Conſtitutions are more frequently troubled with the *Piles* than others; and that Diſtempers manifeſtly *Bilious*, are attended with Symptoms reſembling thoſe of Women who labour under difficult *Menſtruation*: Their *Pulſe* increaſes, their *Heads* ake, they *Vomit*, they have *Cholical Pains*, and feel a general *Fulneſs* and *Stiffneſs*, and are relieved in great Meaſure by Bleeding from moſt of theſe *Symptoms*, which a Critical Diſcharge carries off.

It may be objected, That Men abound with *Bile* as well as Women: But to that Objection I take the Liberty to anſwer, that they do not, nor with any other Humour that is permanent in the Body, *Semine excepto*. For as in Men the *Pores* of the Body are more open, and carry off more of the *Serous* Part of the Blood, which is the Vehicle of all the other Humours; ſo conſequently, a greater Part of each of them is diſcharged through them, than in Women, in whom the Superfluity muſt continue to circulate with the Blood, or be gather'd into proper Receptacles, which is the Caſe of the Bile.

The ſame Argument which holds, why *Menſtruation* ſhould not belong to Men; will hold likewiſe in Brutes, whoſe Pores are manifeſtly more open than thoſe of Women, as appears by the Crop of Hair which they bear; for the Vegetation of which a larger Cavity, and a wider Aperture of the

Glands, is neceſſary, than where no ſuch Thing is to be produc'd. Yet there is a Difference in this Point between the *Males* and *Females*, even in them: Theſe latter have their *Terms*, tho' not ſo often as Women, nor in the ſame Form or Quantity, though Blood ſometimes be the Reſult of them.

No Anatomiſt, that I know of, has yet offer'd a ſatisfactory Reaſon, Why a Sort of *Bile*, more thin and acrimonious, ſhould be ſeparated into a Receptacle by it ſelf, and not conſtantly diſcharged, as that of the *Porus Bilarius* is. They have generally referred it for the Uſe of Chylification; but beſides, that it appears to be no proper Ingredient of ſo ſweet a Juice as Chyle is, they have but precariouſly affirm'd it only, and have not given us any neceſſary, nor to me convincing Arguments, of its *Inſtrumentality* in that Caſe; nor indeed can I help ſaying, that they have brought it without Neceſſity into an Operation which might be compleat without it.

I think it unneceſſary to apply this *Hypotheſis* to the ſeveral *Phænomena* of the Malady, whether in a natural, regular, or a diſeaſed Caſe. The Solution of particular *Problems* relating to this Part of the Animal Hiſtory, flows very readily and naturally from it; and whatever may be urg'd for the *Power* of a *Plethora*, or of any *particular Ferment*, may be applied without any Straining to this. The only Difficulty is, whether the *Bile* be a ſufficient Inſtrument to produce theſe Effects: And if it be, whether it does get into the Blood, as I conceive. I ſhall not ſwell this Work with Arguments to prove theſe two Points; for one I think is on all Hands conſeſs'd, and the other I think reaſonable to be believed. What I deliver, I lay down *Problematically*, with free Liberty to all Mankind to examine it impartially, and ſhall be as ready to receive the Truth, however contrary to my preſent Sentiments, as I am now to impart my own Opinion.

Of Generation.

THE *Organs* of *Generation* have been already deſcrib'd: But there remain ſome Doubts about the efficient Cauſes of it, which are not ſufficiently adjuſted. It is agreed on all Hands, that there are in the *Ovaries* of *Women* little *Eggs*.

Theſe *Eggs*, moſt *Modern Anatomiſts*, and the moſt Able till very lately, have maintain'd to be the *material* and *formal* Rudiments of the Body of the *future Man*, which the *Seed* of the *Male* did only impregnate and vivify. But that the *Ovum* it ſelf did, before Impregnation, formally and materially contain the Body of the *Man*, though it could not germinate and increaſe till render'd Prolifick by the Seed of the Male.

This Opinion was firſt broach'd, and laid down with Strength of Reaſon, by our great Countryman Doctor *Harvey*, in his Book *De Generatione Animalium*. It procured almoſt univerſal Aſſent from the Writings of that Author, and ſeem'd perfectly eſtabliſh'd by *De Graef*, till the *Microſcopical* Obſervations of Monſieur *Lewenhoeck* gratified ſomewhat upon it, and took ſomething from it.

That ingenious Gentleman, to whoſe happy Curioſity we are oblig'd for abundance of uſeful Diſcoveries, pretends by his Microſcopes, to have diſcover'd in the Seed of the Male, as well *Humane*, as of divers Sorts of *Animals*, innumerable extremely minute *Animalcles*, moving with great Vigour and Celerity in the Fluid; which he maintains to be *Animals* of the *Species* of that Creature whoſe the Seed is.

The Communication of his Obſervations has moved the Curioſity of abundance of other learned Men to make the ſame Inquiry, with ſuch Glaſſes as he has deſcribed; and by their own Acknowledgments, they appear to have done it with the ſame Succeſs. I have had the ſame Curioſity; and

must confess, that the Appearance answered beyond my Expectation, and came up to all the Representations that had been given of it.

The *Animalcles* (notwithstanding the very small Compass the Eye can take in at once thro' such a Glass) appear'd in prodigious Numbers, moving with great Velocity, diversly, and, as it seem'd, arbitrarily: Their Figure was exactly like that of *Tadpoles*, and they appeared in the Liquor black like them, and about the Size they are figur'd in the *Philosophical Transactions*, N° 284. where a Description of them more at large may be found, what I have here said being sufficient for my Purpose.

This *Discovery* has been the Foundation of a *new Theory* of *Generation*, in which this *Animalcle* is supposed to be the entire *Fœtus*, and the *Ovum* before-mentioned to be only a Kind of *Matrix*, and to afford a *Pabulum* to the *Embryo*. For notwithstanding this Discovery, the Existence of true *Ova* in viviparous Females is not contested, nor is it indeed contestable.

I should very readily go into this latter *Hypothesis*, if I did not meet with some insuperable Difficulties (to me at least they appear such) which equally press either *Hypothesis*. The first supposes the Animal to be entirely included in the *Ovum*, before Impregnation; and that the Seed of the *Male* does only vivify, or give Life and Power of Vegetation, as we said before. The latter affirms the *Embryo* to be entire, perfect and alive, in the Seed of the Male; and like the Seed of a Plant, to want only to be cast into a *Soil* or *Matrix* proper for its Increase or Vegetation, which they suppose the *Ovum* to be.

But neither of these *Hypotheses* accounts fairly and fully for *mix'd Generation:* For besides the vast Variety of *Mongrel Dogs*, begotten betwixt *Sires* of different *Species*, there have been abundance of Observations of Mixtures of Animals of more remote Kinds; such as between a *Pheasant-Cock* and *Hen*; a *Bull* and a *Mare*, which has been often enough observ'd to procure a particular Name, and is call'd a *Gimar*; a *Cat* and a *Rat*, (of which, however improbable it may seem, there is an Honourable Family that can produce abundance of Witnesses;) a *Buck-Rabbet* and a *Guinea-Sow*, of which lately I have had a very credible Account. But the most common of all these Animals of mix'd Breed (except the Dogs) is the *Mule*, begotten by an *Ass* upon a *Mare*.

If the *Ovum* contain'd the form'd Animal, then the *Fœtus* ought to follow the *Species* of the *Mother*, let the *Sire* be what it will; because he contributes nothing but means of Life and Vegetation, the Animal being determin'd before-hand: And the *Kind* should be as certain as in *Plants*, where, let the Seed be thrown into what Soil soever, that does not alter the Species of the Plant, tho' it may the Growth and Vigour of it.

The same Objection lies yet stronger against the *Animalcles*. For if that *Hypothesis* be true, the *Sperm* of an *Ass* is full of *little Asses*; and the being nurs'd by a *Mare* should never make *Mules* of them, because the *Species* is pre-determined, and the Creature not only form'd, but living. I might perhaps as reasonably object, the Similitude the Children of the same Parents bear to their Ancestors; some to the Father's Line, and some to the Mother's: Which plainly shews, that to the Determination of the Species, both Sexes concur; and that sometimes one may prevail, and sometimes the other; which could not be, if both these *Hypotheses* were strictly or absolutely true. I know some endeavour to get over this Objection, by fancying that the different *Matrix* may have so much Effect, as to alter the Figure of the Animal so far, as may account for these mixt Appearances. But this is so poor, so unphilosophical a Shift, that it is not worth an Answer; and they might with as good Authority persuade me, that an Orange-Tree transplanted from *Sevil* to *England* would bear Apples; and so *vice versa*. It is a common Practice in Gardening, to graft one Fruit upon another Stock: But the Fruit still follows the Species of the Graft or Cyon, and bear like the Parent Tree, not the Stock it grows upon.

These Difficulties render both these *Hypotheses* unsatisfactory to me; and however old and exploded the Opinion of a *Plastick Power* on both Sides be, I must however embrace it, even tho' I know not exactly wherein it lies; at least till I meet with some-

what more ſufficient to reſolve my Doubts than hitherto I have done.

It is however agreed, that tho' the *Ovum* of the Female does not formally contain the Animal, yet in Impregnation that it is a *Cauſa ſine qua non*, and that Generation cannot be without an Egg rightly diſpoſed: And upon that Conceſſion (which I think is at this Time univerſal) I ſhall proceed to examine ſome of the principal *Phœnomena* of *Generation*, and the requiſite Condition of Fœcundity, without concerning my ſelf farther with the Animalcles of either Side; except only to obſerve, that the Exiſtence of a form'd Animal in the *Ovum* has never been proved, but ſuppoſed only from the Ana- gy it is imagin'd to bear to the Seed of Pl- in ſome of which the Figure of the P- has by the Microſcope been diſcover'd. T- other *Hypotheſis* ſeems to ſtand upon - Foot of Autopſy, but Reaſon, as we have - ſerv'd, ſeems to be againſt it: And it is - impoſſible, but that theſe ſeeming *Ani-* may be nothing more than ſome larger P- ticles of a mixt Fluid, whoſe Motion - different Figure the Microſcope diſcover- our Eye, while yet the minuter Parts - not diſcover themſelves even that W- But we leave theſe Things to the Arbi- ment of the Learned.

Explication of Four Figures taken from De Graef *of the Organs of Generation in Men: Where* Tab. VIII. *ſhews the Genital Parts cohering, as th- from within.*

A. The inward Part of the Urinary Bladder.

B. The Neck thereof.

C, C. Parts of the Ureters.

D, D. Parts of the *Vaſa Deferentia.*

F, F. The Seminal Veſicles.

G, G. The inward Part of the *Paraſtatæ* or Glandulous Body.

H. The *Urethra* lying to its ſpongy Part.

I, I. The ſpongy Part of the *Urethra.*

K, K. The Muſcles that erect or extend the *Penis.*

L, L. The Beginning of the Nervous Bodies ſeparated from the *Oſſa Pubis*, which ſwell like a Pair of Bellows while the Yard is blown up.

M, M. The Skin of the *Penis* drawn to the Sides.

N, N. The Duplicature or Foldings of - Skin which forms the Prepuce.

O, O. The Skin faſten'd behind the Gland.

P, P. The Back of the Yard.

Q. The *Glans*, or Nut.

R. The Urinary Paſſage, whereby the Gl- is perforated in the inward Part.

S, S. The Nerves running upon the Back - the Yard.

T, T. The Arteries in like Manner.

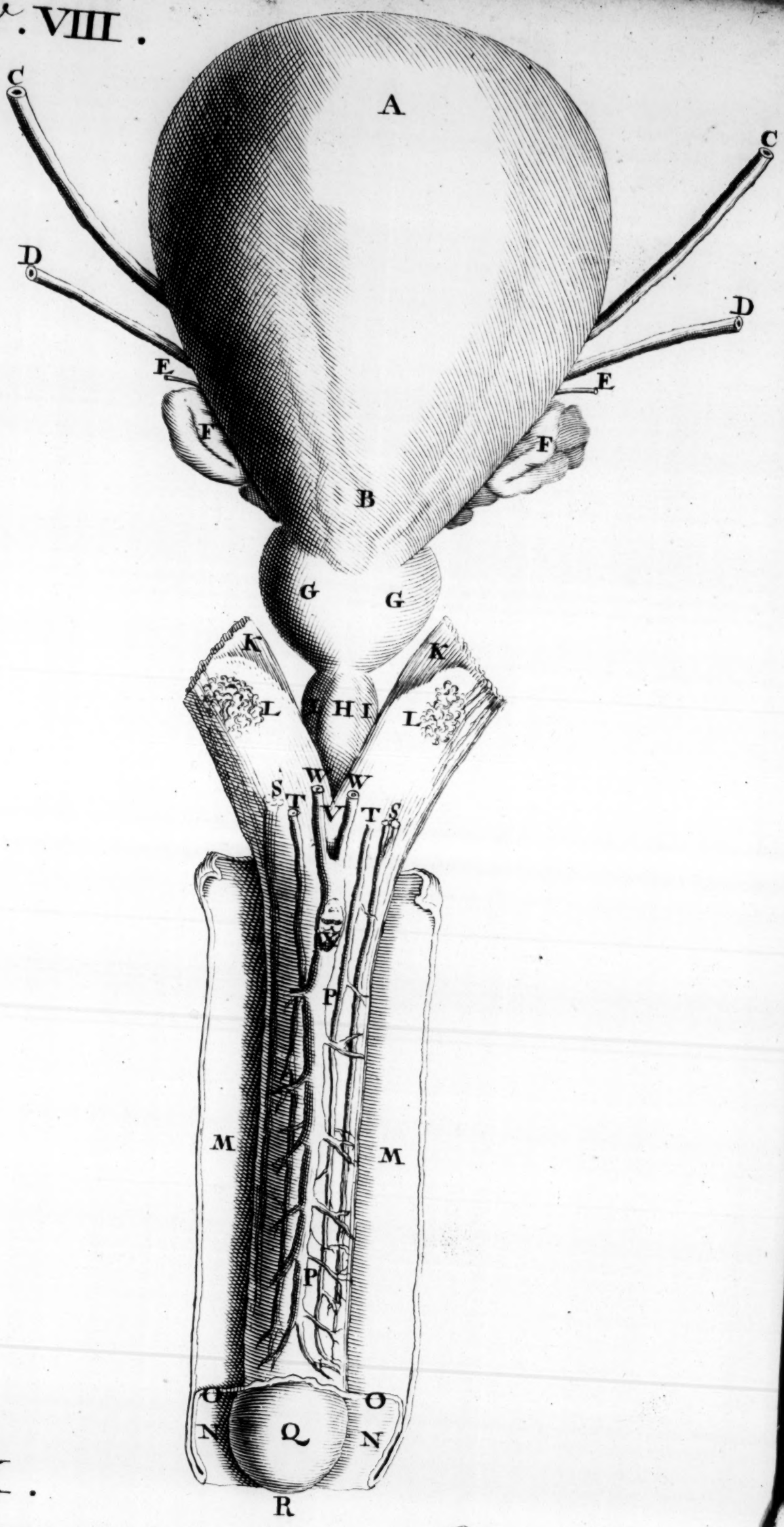
V. The Nervous Bodies joining together.

W, W. Two Veins, which unite toget- and run out by the Back of the *Penis* - one large Branch.

X. The Veins opened, ſo that the Va- may appear in them.

TAB. I

Tab. VIII.



Tab. X.

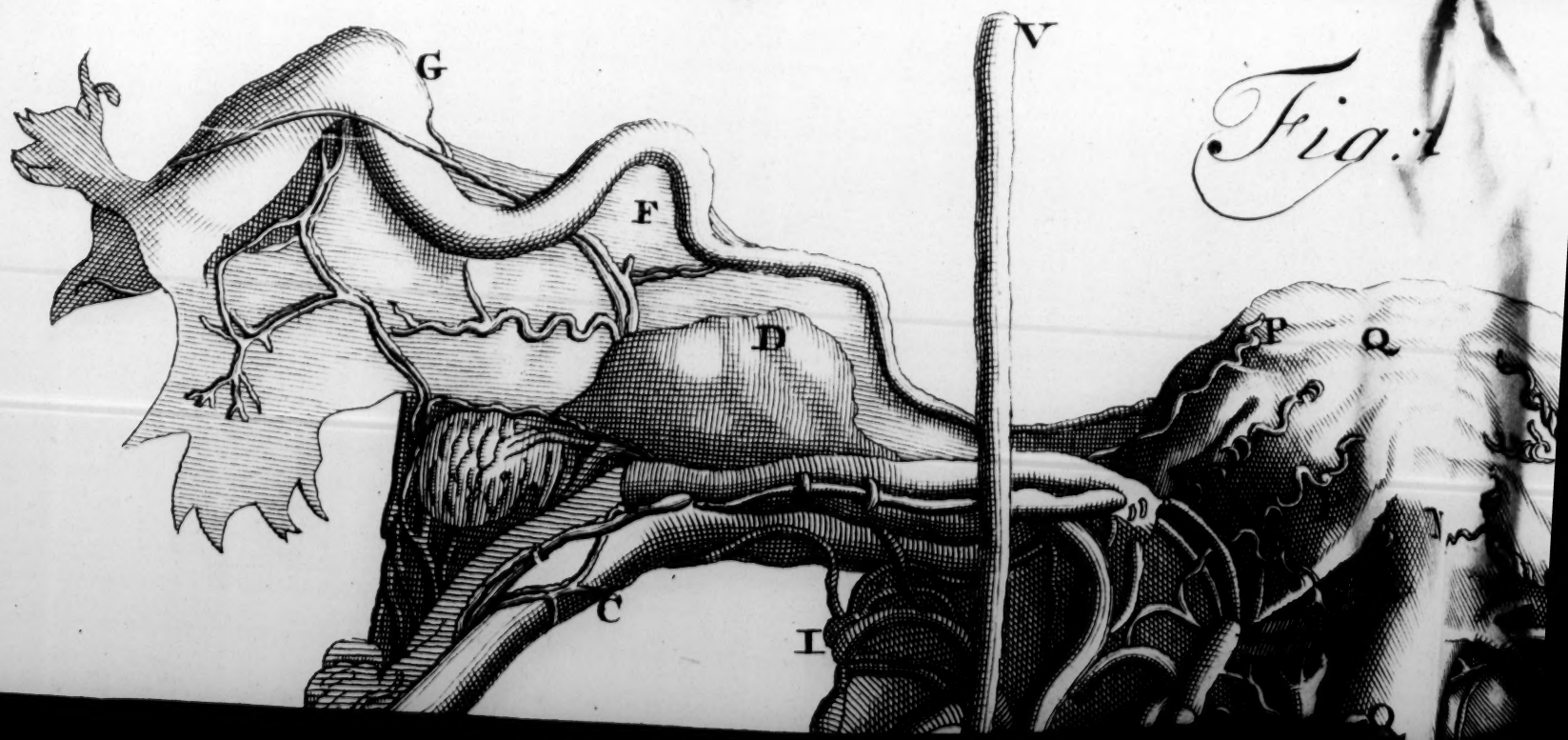


Fig. 1

.IX.

I.

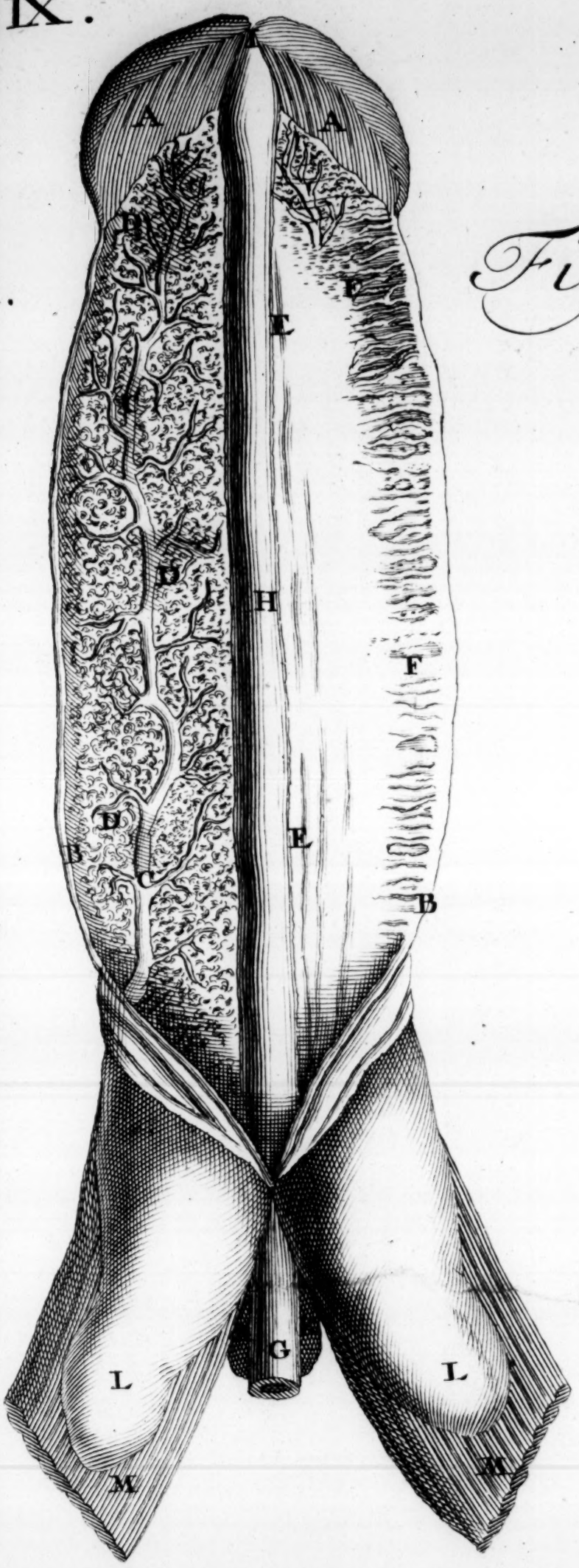


Fig. II.

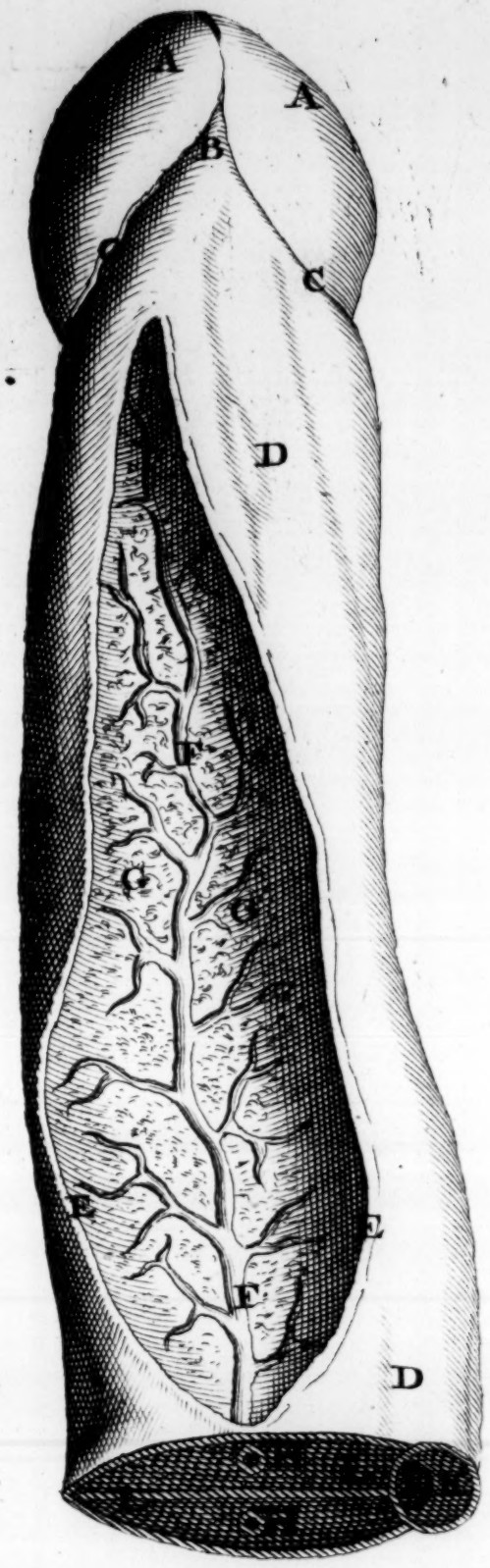
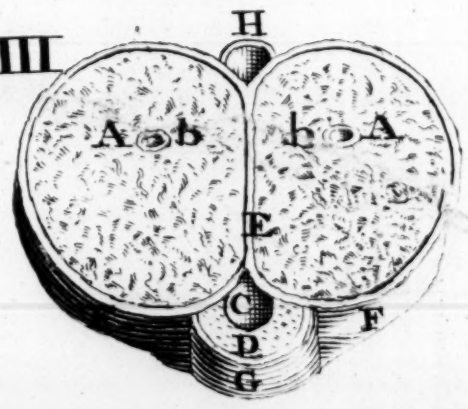


Fig. III



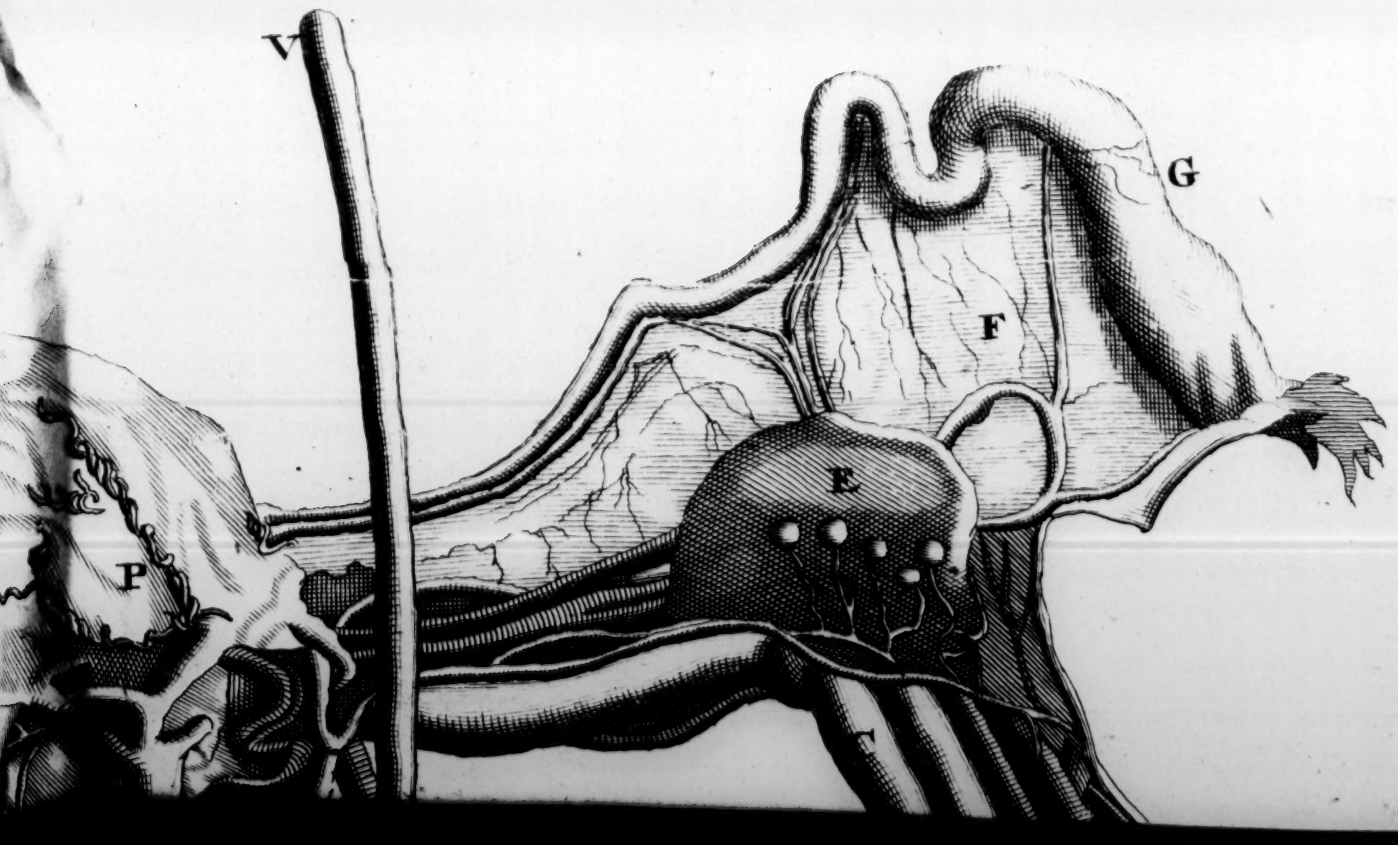


Fig. 1.

V

G

F

E

N

P

C

M

L

A

B

K

H

T

Z

Fig. II

G

B

C

D

E

F

A

TAB. IX.

Fig. I. *Shews the Virile Member divided in the Middle, from the upper Part to the* Urethra.

A. The *Glans* of the *Penis*, with its Nervous Bodies divided through the Middle.
B. The Membranes of the Nervous Bodies of the Yard laid ſeparately aſide by themſelves.
C. The Artery creeping along through the ſpongy Subſtance of the Nervous Body.
D. The membranous or ſpongy Subſtance of the Yard, by which the Ramifications branch out.
E. The *Septum Intermedium.*
F, F. The Origines of the Fibres of the *Septum Intermedium.*
G. The *Urethra* cut off about the glandulous Body.
H. The Middle of the *Urethra.*
I. The End of the *Urethra* perforating the Gland.
K, K. The ſpongy Subſtance of the *Urethra.*
L, L, The Beginnings of the Nervous Bodies dilated like Bellows.
M, M. The Muſcles erecting the *Penis.*

Fig. II. *Shews the Virile Member opened lengthways.*

A. The *Glans* naked.
The Bridle.
C. A ſmall Part of the Skin, from which the remaining Part that covers the *Penis* is ſeparated.
D. The *Urethra* ſubjacent to the Nervous Bodies.
F. The Artery running through the ſpongy Subſtance of the Nervous Body.
G. G. The ſpongy Subſtance of the Nervous Body.
H, H. The Orifices of the Arteries cut off, apparent in the Nervous Bodies.
I. The *Urethra.*
K. The ſpongy Subſtance of the *Urethra.*
L, L. The *Septum Intermedium* of the Nervous Bodies.

Fig. III. *The Virile Member cut tranſverſe.*

A. The ſpongy or fibrous Subſtance of the Nervous Bodies.
The Arteries ſtraggling through the Nervous Bodies.
The Urinary Paſſage of the *Urethra.*
The ſpongy Subſtance of the *Urethra.*
The *Septum Intermedium.*
F, F. The ſtrongeſt Membrane of the Nervous Bodies.
G. The thinneſt or ſlender Membrane, containing the ſpongy Subſtance of the *Urethra.*
H. A large Vein creeping through the Back of the *Penis.*

Ex-

Explication of the Two Figures taken from Swammerdam.

TAB. X.

Fig. I. *Which ſhews the back Proſpect of the* Uterus *of a Woman after Delivery.*

A, A. The Spermatick Arteries.
B, B. The Spermatick Veins, which, after ſending a Number of Branches to the *Ovaria* and *Fallopian Tubes*, have divers notable *Anaſtomoſes* with the *Hypogaſtrick* Arteries and Veins about the Neck of the *Uterus*.
C, C. The Arteries and Veins that form on each Side the *Corpus Pyramidale*.
D. The Left *Teſtis* or *Ovarium* covered with its proper Membrane.
E. The proper Membrane of the Right *Ovarium* opened and expanded, to ſhew the Diſtribution of Arteries into the *Ova*, of which a few only of the leaſt are here figured, that they may appear more diſtinct.
F, F. The membranous or broad Ligaments of the Womb, call'd *Alæ Veſpertilionum*, which the Spermatick Veſſels traverſe in the Way to the *Tubes*.
G, G. The *Cornua* or *Tubæ Uteri*, reaching from the *Fundus* of the *Matrix* to the *Ovaria*, and ſerving for the Conveyance of the *Ova* from thence to the *Uterus*.
H, H. The round Ligaments of the Womb on each Side.
I. The Riſe of the Arteries and Veins of the round Ligaments on the Left Side.
K. A Valve.
L, L. The two Hypogaſtrick Arteries.
M, M. The Hypogaſtrick Veins.
N. The Body of the *Fundus Uteri*.
O. The Neck of the *Uterus*.
P, P, P. The Arteries on the Body of the *Uterus* turn'd ſpirally, like the Tendrils of a Vine.
Q, Q. Numerous Veins of the *Uterus* appearing prominent through the exterior Membrane, and ſhewing divers *Anaſtomoſes* ſcattered up and down.
R, R. The *Vulva*, or *Vagina Uteri*, reaching from the outward *Oſtium* of the *Pudendum* to the inward one of the *Matrix*.
T, T. The lower Surface of the Bladder of Urine.
V, V. The Ureters deſcending to the Bladder.
X, X. The *Urethra* or proper Channel of the Urine cut off near the *Pudendum*, together with the *Vagina*.
Y. A Piece of the *Urachus*.
Z, Z. The Umbilical Arteries.

Fig.

g. II. *One of the* Fallopian Tubes, *with its Blood-Veſſels filled with Quick-ſilver and Wind, to ſhew their Progreſs on one of the* Alæ Veſpertilionum, *with the Reticular Diſtribution of the Veins on the* Parietes *of the Tube, and its foliated Expanſion, whereby theſe Parts become diſtended, and are rendered capable each of embracing the* Ovarium *on their own Side, in order to convey the* Semen Maſculinum *from the* Uterus, *as well as to tranſmit the impregnated Egg afterwards to its* Fundus.

A. That Part of the *Tube* next the *Uterus*.

B. Its other Extremity, which is a little contracted before it makes its foliated Expanſions.

C. Its foliated Expanſions here diſtended with Wind, as they are with Blood *in Coitu*.

D. The Orifice at the Extremity of the *Tube* dilated.

E. One of the *Alæ Veſpertilionum*, with its,

F. Veins and Arteries continued from the Hypogaſtricks of the *Uterus*; the former, that is,

G. The Veins, making a cavernous or reticulated Body on the Sides of the Tube.

Of the Generation, Formation, Nutrition, and Birth of the Fœtus *from the Mother's Womb Taken from* Harvey, Needham, Leeuwenhoeck, De Graef, Swammerdam, St. Hilaire, Tuvry, Mery, *and* Buſſiere.

THE new Diſcoveries that have been made in Anatomy of late Years, plainly ſhew, that the Females contain in themſelves whatever is proper for the formation of the *Fœtus*, but that it is the Semen of the Male which alone contributes to Generation, by the ſpirituous and volatile Parts therein, that diffuſe themſelves in a ſubtil Vapour to the *Ovaries*, and vivify the Egg, notwithſtanding their Progreſs through the Veſſels, and their Mixture with the various Fluids of the Body. Sometimes it happens, that all the Eggs have not the ſame equal Adheſion in the *Ovaries*, ſo that the Spirits acting upon or impregnating two or three, and ſometimes more of them, they leap from the *Ovaries* into the *Tubes*, and from thence fall into the Womb, where there are ſeveral *Fœtus's* formed. The *Semen* of the Male having penetrated the Eggs, it makes the Fluid ferment after the ſame Manner as Leaven ferments Paſte. This Fermentation dilates and ſwells the Pellicles of the Egg, it drops out of the Socket, and the Membrane of the *Ovary* by its Contraction drives it out.

The more ſpirituous Part of the *Semen* is filter'd through all the ſpongy Paſſages of the Womb and the Tubes to the very *Ovaries*, much after the Manner as Water is filter'd through Paper. This ſeminal Spirit puffs up the *Matrix*, and occaſions all thoſe Diſorders we obſerve after Conception; and it is the ſame Spirit that cauſes the broad Ends of the

the Tubes to approach from the *Ovary:* And as all this cannot happen but by a Fermentation of the nutritious Juices, there is a Neceſſity that the Nerves of thoſe Parts ſhould be irritated, which is the Reaſon that determines the Animal Spirits to flow into thoſe Parts. If it is ſaid, that Seroſity or Moiſture, which always wets the *Vagina*, and is ſometimes ſo plentiful in Coition, do put a Check upon the ſeminal Spirits, and hinder their Activity; we anſwer, That the Liquor which is filtred by the Glands of the *Vagina*, is ſo far from leſſening or abating the Force of the Spirits of the *Semen*, that it very much increaſes it, becauſe it is ſpirituous, and being join'd to that of the *Semen*, cauſes a briſker and more ſubtil Fermentation.

The Egg being dropped from the *Ovary*, and deſcended into the *Matrix*, it is water'd afreſh by that Liquor which is wholly fill'd with the ſpirituous Particles of the Male Seed; the Womb is extended abundantly more, the *Coliledons* are tumefied, all the nutritious Liquids become more active, ſo that they cover the Parts of the *Fœtus*; ſo that they encreaſe daily from the Nouriſhment they receive. The Fæcundity of the Egg depends on the Rapidity with which the Spirits of the *Semen* inſinuate themſelves into it, to open all the Parts at once, by penetrating all the Canals or little Channels, ſo that they may be capable of receiving the Nutritions. This Aperture proceeds from the more ſpirituous Particles of the Male Seed, which having different Figures, and different Degrees of Motion, more readily penetrate the Matter of the Egg, by unlocking the Parts, and from a Chaos of Confuſion, producing a regular Animal Body.

Mr. *Leeuwenhoeck*, ſpeaking of Generation by an *Animalcle* of the Male Seed, ſays, that being ſollicitous to examine the Generation of *Frogs*, upon the account of their young Ones being like a Worm, with a round thick Body, and a ſhort Tail, he was ſurprized that the *Male* was not join'd to the Female in Copulation, but that he only ſat upon her, and had no *Membrum Maſculum*; that at the ſame Time when the Female caſt her Eggs or Spawn, the Male alſo dropped his *Seed*, which is to be ſpread under the Eggs; in like Manner as the Seed of Fiſhes that want the *Membrum Maſculum* caſt under the Eggs of the Female, that the *Animalia in Semine* may conveniently impregnate the Eggs: For, continues he, I hold it neceſſary that ſome one of the Animals in *Semine* ſhould get into a certain Point of Speck of the Yolk of the Egg, which Point is the *Cicatricula* which is only fit to receive it, and give it the firſt Nouriſhment, till ſuch Time as the Egg comes to be ſat on; but if no Animal ſhould find or hit upon this Point, then the Egg is unfruitful; and this may be a good Reaſon why there are ſo many Thouſand more Animals *in Semine Maſculo* than Eggs in the Female.

In ſeveral of my Obſervations, ſays the ſame Author, I had not found the Animals taken out of the Teſticles and *Vaſa Deferentia* of Frogs to be alive: But on the firſt of *April*, when Frogs were ready to ſpawn, I took ſome of the Males ſitting upon the Females and ſqueezed their hinder Parts, that I might get the Seed out of the *Vaſa Deferentia*; but the *Animalcles* I then found moved but little, becauſe the Matter they were in was full of ſalt Particles, which made me judge it to be Urine.

I then cut open the *Teſticles*, and there I found an innumerable Company of *Animalcles* ſwimming among a Sort of ill ſhaped Particles. Theſe continued alive till the next Day, tho' there were but a ſmall Quantity of Liquor to contain them. I judge the Bodies of the *Animalcles* to have been of the Thickneſs of $\frac{1}{1000}$ Part of the Hair of my Head. If the Matter they moved in had not been ſo thick, I ſhould have ſeen them much plainer; but I have deſcribed them to the beſt of my Apprehenſion. The firſt *Animalcle*, as it lay in the watry Matter, and moved it ſelf therein, had the Head ſometimes appearing thicker than at others, and often I could but ſee Part of the Body. When the Animal moved it ſelf ſtrongly tho' the Progreſs was but little, the Motion towards the Head was like that of a Snake, and the Tail was caſt into 3 or 4 Bows. I obſerved another *Animalcle* lying dead, and ſtretched out at Length; but in this Poſture I ſaw but few, for many that were dead lay with the fore Part of their Body bent in, others made as it were a half Circle, other

had the fore Part of their Body bent, and moved their hinder Parts. These last I took to be ready to die.

The Number of *Animalcles* in all the Seed was so great, that I reckon there might be 10000 of them to one of the Female's Eggs. The same Computation I formerly made of the Milt of a *Codfish*; but it must not be thought that all the Animals in the Milt of a *Codfish* live together, but only such of them as are neareſt the Passage they are to be cast out of, and who have more Moisture about them: The rest of them being more remote in the Body, and being incompass'd with a thicker Matter, are not alive; for tho' some Fishes, as the *Bream* and *Trout*, cast their *Milt* and *Spawn* in two Days Time; yet *Codfishes* are about a Month in doing it, in all which Time the Seed is successively ripen'd and perfected: So also are Frogs, by what I have experienced, for the first Animals I sought were dead, and though I afterwards found live Ones, yet those were dead that lay deepest in the *Testicle*.

'Tis well known, that when a Cock hath trod a Hen but once, many Eggs are made fruitful: The Reason that I give for it is, that many of the Eggs in the *Ovary* have each of them received an *Animalcle* out of the *Male Seed*. This *Animalcle*, while the Egg is sate upon, does not presently take the Figure of a *Chick*, but grows into a disorderly Bulk, wherein the Heart is first plainly to be discern'd. Other *Fœtus's* have a different Way of Growth: The *Louse* has all its Parts, and is a Breeder, while it is yet in the Egg. The *Flea* shows like Globules swimming in a watry Substance; it afterwards becomes a Worm, and then a *Nympha*. The *Frog* is a thick Worm till it be of a considerable Bigness. The Humane *Fœtus*, tho' no bigger than a Green Pea, yet is furnished with all its Parts. I have often endeavoured to discover the Animal coming out of the Male Seed in the Egg of the *Hen*, but have been unsuccessful, tho' some of the Globules of the Egg have magnified to the Bigness of common Apples. This Disappointment has put me upon the Eggs of Insects, as the *Flea* and *Louse*, which being very small, may be so much the fitter for this Discovery.

A certain Physician, writing of Generation, sets down these Words in the Margent: *From the Female Seed the Fruit must grow, however the Thing came to pass.* This he enlarges upon in the Text; but I think, under Correction, that by one Instance I shall bring a sufficient Proof of the Fruit's coming from the Male Seed, and the Female's only contributing to the Nourishment and Growth of it. Many of our Neighbours, either for their Pleasure or Profit, keep tame *Rabbets*, which are large, long ear'd, ordinarily of a white Colour, but sometimes of a blue, black, and pied; those that would make a Profit of these *Rabbets*, by causing them to bring gray young ones, which in the fore Part of the Year may be sold for a wild Kind, get a gray *Male*, such as are commonly found on our *Sand hills*, to put to their *Female*. The Brood that comes from hence always takes the grey Colour of the Male, and it has never been seen that any of the Young has had any white, or other coloured Hair than grey: There with all they are never so big as the *Dam*, nor have so great Ears, nor are so tame, but are of a wilder Kind.

The first *Frog* which I anatomized lay on the Ground in my Way, and seemed so weak through Cold, that tho' I kicked it with my Foot, it would not leap away. This proved a Female. In the Guts of it I found *Worms*, like those in Children of about the Bigness of a Hair of my Head. The Blood consisted of flat oval Particles, swimming in a clear Liquor. These had no Colour as they lay singly, but when two of them lay upon one another, their Colour was stronger; but there was another small Oval hard by, which showed of a higher Red than the three others. Many of these oval Particles were very pleasant to look upon, especially when the Moisture wherein they swam, having also Globules on the Surface as big as a 6th Part of a Blood Globule, was evaporated; for some had in the Middle Shade, others appeared as if they were made of several Ovals of unequal Bigness, others seemed to be set round with small Globules, others had no Globules in the Circumference, but several in the Middle. These Globules, I believe, were at first swimming in the watry Liquor under the *Ovals*, tho' now they cleave to them.

Upon the Plate whereon I laid the Frog that I anatomized, I found ſeveral Animals moving in a watry Blood. They were about half the Bigneſs of the oval Particles, and about 50 of them might lie in the Space of a Sand. Theſe I had never ſeen in the pure Blood, nor could I perceive them in the Water that came out upon ripping the Skin from the Fleſh, or upon opening the Belly, or ſqueezing the Head of the Frog, to make it lie quiet upon the *Plate*. At length, in the Month of *June*, I met with ſome Frogs whoſe Excrement was full of an innumerable Company of living Creatures of different Sorts and Sizes: The whole Excrement beſides was ſo full of living Things, that it ſeemed all to move, and I gueſs'd there was not leſs than 1000 of the Sort like River Eels in the Compaſs of a Sand. From hence I concluded, that the Animals found among the Blood might come from my cutting a Gut.

By the Way, I obſerved ſomething of the Damage that Frogs may do to Fiſh-ponds; for I took out of ſome of their Stomachs 8 or 10 young Fiſhes. I took notice of a ſmal Vein, of about the Thickneſs of a Hair, tha when the Blood was cut out of it, the Coa was like a Frog's outward Skin. The ſame Coat of the Vein was made of Threads o Filaments running by the Side of one ano ther, juſt as if they had been wound cloſ about a ſmall round Stick, ſo as to cover i all over. Now if there be *Capillaries* in th Body a thouſand Times leſs than this which I examined, how thin muſt the Threads ne ceſſarily be of which the Coat is made And how eaſily muſt theſe Threads be ſepa rated and divided from one another, ſo as t let the Blood, when it is very forcibly mo ved in the Arteries, ſtart out between them And I was the more confirmed in this Opi nion, upon ſpreading hard the Coat of th Vein, for I then ſaw through it, as throug a Hair Sieve. Hence may a probable Ac count be given of *St. Anthony's Fire, red Swel lings*, or the *Small-pox*; and perhaps the Bloo may be more gently ſtrained through thoſ Paſſages for the nouriſhing of ſome Parts o the Body.

An Account of a Book concerning Generation: *Writ i* Italian *by an Anonimous Author, and dedicated t Seignior* Malpighi.

HE firſt takes notice of the Opinion of the *Schools*, which taught two Sorts of Generation, either by the Seed of the Animal, or ſpontaneous out of Corruption, and ſays, the Moderns reduce thoſe two to one, and having obſerved the Uniformity of Nature in moſt of her Works, have gone yet further, and ventured to prove, that the general univerſal productive Principle of all *Species* is *ex Ovo*; and this he endeavours to purſue in the Works of the Ancients as well as Moderns, and out of Scripture as well as Philoſophy: But one Paſſage is remarkable out of *Hippocrates*, in his Book *de Natura Pueri*, where relating the Caſe of a young Woman who in dancing miſcarried of *Fœtus* of ſix Days old, he ſays it was like raw Egg, the Shell being firſt taken off; a therefore in the End concludes, that the N ture of the *Oviparous* differs not from that Man.

But ſtill there ſeemed to be much Di culty in the Production of Inſects, till Si nior *Redi*, as this Author ſays, did by ma unconteſtable Experiments prove them to generated out of Eggs, and by that convic of Error the Natural Hiſtories of *Ariſt* and *Ælian*, ſhewing the Neceſſity of a n more accurate one, which he owns is w much Glory purſued by the *Royal Socie*

London, as well as that of *Paris* and *Florence*; and particularly makes very honourable Mention of Dr. *Liſter*, for his Hiſtory of Spiders and Snails; and of Mr. *Ray*, for his being the firſt Diſcoverer of their being all *Hermophrodates*, or *Androginæ* as he terms it.

After this, he ſays, the Thing ſeemed out of Diſpute, when out came a Book, called, *The Recreation of the Eye and Mind, in Obſervations upon Snails, by Father* Philippo Bonani, *a Jeſuit*. It being a pretty large Volume, containing the Natural Hiſtory of all the Snail Kind, where he not only doubts of their Production by Eggs, but alſo endeavours to overthrow moſt of Signior *Rhedi*'s Experiments, that tended to eſtabliſh the Principle of an Univocal Generation; to which he prefers the old Principle of Corruption for the Inſects.

While he was reading this Book, he ſays, it was his Fortune, in taking up ſome Flowers, to obſerve by a Border a Cluſter of little Eggs, which had nothing in them but the White, like the White of an Egg; but upon a more diligent Search, he found another Cluſter as big as would fill the Palm of his Hand, out of which came young Snails, ſome having but juſt broke the Shell, others being half out, and others quite out, with the *Teſta* of the Egg faſten'd to the Tail of the Animal. He ſays, the Eggs were no bigger than Pepper Corns, and thoſe moſt white; but thoſe which were ready to break tending towards yellow: They were faſten'd in a Lump by a Kind of glutinous Water, and this was about the 10th of *July*. This diſcovery being very plain and remarkable, he called in to ſee it many learned Perſons, and ſome of good Quality, whom he names, that the Truth of his Perſon may be out of diſpute.

This done, he examines the Jeſuit's Reaſons againſt this Univocal Generation, which are in all four: 1. *Ariſtotle*'s Authority. 2. A Principle of his, that teſtaceous Animals have not the Difference of Sexes. 3. A Maxim of the ſame Philoſopher, that no exanguinous Animal is Oviparous. 4. A Collection of ſome Obſervations to confirm *Ariſtotle*'s Reaſons. The three firſt are anſwered by Experiments which confute him, and obſerves, that *Ariſtotle* himſelf, who had more carefully obſerved the *Murex* and *Buccina*, owns, that in the Spring they uſe to get together, and produce a Subſtance like a Honeycomb, full of little Bodies as big as white Vetches, which may be thought to be their Eggs. As to the 4th of the Father's Obſervations, he ſays, he will ſay nothing, but confine himſelf to his own, which he thinks he has ſufficiently demonſtrated.

Extract of a Letter of Monſieur *de St. Maurice*, M. D. to Monſieur *de la Cloſure*, concerning the Formation of a *Fœtus* in the Teſticle. Taken out of the *Journal de Medecine*, publiſhed at *Paris*.

I Think, Sir, that after what lately happen'd to Madam de St. Mere, *we ought no longer to doubt of the Formation of the* Fœtus *in the Teſticles of Women, and conſequently of the Exiſtence of Eggs. This Lady, whoſe Merit is known to you, had been brought to Bed eight Times as proſperouſly as might be, and after having continued Five Years without being with Child, inſomuch that ſhe thought her ſelf freed from thoſe Sorts of Labours, about three Months ſince ſhe ſuſpected her ſelf to be fallen into that Condition again; becauſe having never failed of being very regular, and not finding her ſelf ill, ſhe was more than a Month without her ordinary Relief: But whilſt in this State ſhe had a little Show, which ſcarce left her wholly during the two laſt Months of her Life, and which ſhe paſs'd nevertheleſs without much Trouble, ſo that ſhe thought her ſelf to be ſecure, as to the Point of her being with Child; but that the 22d Inſtant, after ſhe was up in the Morning in very good Health, and had been writing about an Hour, ſhe fell into Faintings, which made her loſe abſolutely her Pulſe from that Moment, without depriving her of her Underſtanding or Speech.*

Mr. de Saint Mere, *who took this Faintneſs at firſt for an Effect of Vapours, was not alarm'd at it, till feeling her Arm, he found her without any Pulſe. This Privation, join'd with a mortal Paleneſs, amuſing him, he ſent a Man to intreat me to go and ſee her. I came about eight of the Clock in the Evening, found her cold, and wholly without any* Pulſe; *her Countenance deadiſh, and covered with a clammy and cold Sweat, having ſtill an entire Underſtanding,*

and her Speech ſtrong. She complained of a great Cholick in the Region of the Right Groin, which terminated at the Reins. This Cholick was ſo violent, that as I was going to touch the Place, ſhe prayed me not to preſs it, and told me I ſhould make her fall into a Swoon. In a Moment after, ſhe felt all the Preludiums *of an imminent Travel. She called for her Chirurgeon, and died in his Arms, ſaying,* I am delivering, I am delivering. *There appeared outwardly neither Diſtillation nor Flooding, nor any Mark of this Diſorder. A Death ſo little expected amazed every Body, and ſurpriz'd ſo much Monſieur* de St. Mere, *that he was deſirous to know, whether opening the Body would not diſcover the Cauſe. Monſieur* de la Cheſe, *a Surgeon, was made Choice of to do it, and I was prayed to aſſiſt Meſſieurs,* de Montanzon, *Advocate of* Perigmez; de la Porte, *Gentleman to Monſieur* le Comte de Taleran; du Vaire, *Apothecary to* St. Mere; *and two* Valets de Chambre *of the Houſe, deſired to be preſent at the Opening; and this is what we found:*

As ſoon as the Chirurgeon had opened the Integuments of the Belly, we ſaw in the Epigaſtrick Region all the Entrails floating in Blood. I cauſed two Pounds to be taken out with a Spoon, to avoid changing the Situation of the Parts; after which, ſeeing that there remain'd in the Right Flank a prodigious Quantity which was coagulated, I tried my ſelf to take it out with my Hand; but judge, Sir, how I was ſurpriz'd when, among the firſt Clots which I drew forth, I found a little Fœtus, *about the Bigneſs of a Thumb, a third leſs in Length, all very diſtinctly form'd, and in which was manifeſtly diſcovered the Sex of a Boy, but naked, and without covering. I put this* Fœtus *upon a Plate, and ſhewed it to all that were preſent; and being impatient to know from whence it came, I applied my ſelf with all Exactneſs to examine all the neighbouring Parts of the Place whence I took it. Two Fingers from this Place I found the right* Cornua *of the Womb, but my Amazement was doubled, when I found the* Teſticle *torn lengthways, and through the Middle, on the Side that it did not touch the* Tuba Fallopiana, *and all its Cavity full of clotted Blood. I no longer doubted but this was the Place where this Infant was formed, and I conceived, that having acquired in this Place a Growth too great to be able to fall in Time, a having continued to grow there, without bei able to come forth, it had at length broken Priſon by ſtretching it.*

I was confirm'd in my Opinion, when, compari this Teſticle *with the Left, I found it at le four Times bigger, its Bulk approaching that an Hen's Egg, and the Left not being larger th a ſmall Cheſnut. It was all red without a within, beſides the clotted Blood that it contain whereas the Left was pale, and full of little Gra of the Colour and Conſiſtency of yellow Tallow. examined the Tube on the right Side, and I co not find that this Infant had ever entered ther it was in all Things like the Left Tube. Laſt I examined the Body of the Womb with all Care and Exactneſs that might be; it appear to me every where without any Rent, and in State purely natural: I only obſerved, that was a little bigger and ſofter than it is found Women who die without being with Child. It w all as Doctor* Harvey *has deſcrib'd it in the f Month of Pregnancy. I cauſed a Probe to put into its Cavity by the* Vagina, *and then be cut open, and I found not the leaſt Sign Conception. Indeed the Veſſels of the inter Membrane appeared to me full of Blood, and v* ricous *as it were, which doubtleſs was the Ca of that little Show of Blood as before-mention*

Tho' it were needleſs to ſearch elſewhere for Death of this Lady, we nevertheleſs examin all the other Parts of the Belly, and of the Bre and found them all well in Order, and in a St purely natural. I leave you now to judge w may be concluded from all this, ſince no Per can draw better than your ſelf the Conſequen which neceſſarily follow from this Phænomen *Authors ſpeak of certain* Fœtus's *found in* Tubes, *as* Cyprianus *hath related a (which will be inſerted in its proper Place); others that have been found in the Cavity of Belly, the Womb or Tubes not being any W lacerated. But I do not think that any Per hitherto has been able to ſhew that the Concep is made in the* Teſticle *or* Ovarium, *as it ſe the Fact now related does manifeſtly demonſtr And it is this which has made us think hithe that the Opinion of Eggs had till now need Proofs to ſupport it.*

A L

A Letter from Monſieur *Buiſſiere*, concerning an Egg found in the *Tuba Fallopiana* of a Woman lately diſſected, with ſome Remarks touching Generation.

THE Subject hereof was a young Woman of about 25 or 26 Years of Age, which had been but lately delivered of a Child, as appeared to the Author from the following Reaſons: Firſt, becauſe the little Breaks or Cicatrixes of the Cuticle *of the Belly were yet freſh; Secondly, becauſe the Laceration betwixt the Legs was not yet heal'd up; and Thirdly, it appeared from the Largeneſs of the* Matrix, *and in ſhort, from the opening of the* Ovary *on the Left Side, by which the Egg, which had ſupplied the laſt Child was driven out, and which remain'd as yet very large, one Side being a little torn. Notwithſtanding this, that it had been ſo ſhort a Time from her laſt Delivery, ſhe had an Inclination to be debauch'd again; or perhaps ſhe did it with Thoughts to be got with Child, and ſo prevent the Execution of her Sentence, which was to die. However ſhe took the Diverſion with ſome Friend, or one of her Fellow Priſoners, ſo that ſhe conceived; but being executed before the Egg impregnated by the* Virile Seed *had Time to be convey'd into the* Uterus, *when I opened her, ſays this Author, I found, that the* Cornua *on the left Side was extraordinarily dilated towards its Extremity, and that that Dilatation, in its utmoſt Largeneſs, was little leſs than an Inch in Diameter, and ſtretch'd almoſt an Inch and half in its Decreaſe from the Side of the* Matrix. *This Part being dilated, bent it ſelf back, and embraced almoſt all the* Ovary *from the Membrane, to which it was ſo firmly knit, that it could not be rent off but by Force. When it was torn off, there flow'd from it a limpid and unctuous Liquor, which was apparently of Uſe to it, either to relax the Membranes of the* Tubes, *in order to dilate them, ſo that the Egg might ſlip eaſily into the* Matrix; *or poſſibly to lubricate and render the Parts ſlippery, ſo that the Egg might paſs without Pain; or perhaps for both theſe Ends. I examined preſently if there was nothing corrupted in the Body of the Tube which might produce this Liquor; but I could not obſerve that there was any Fault, but that it was ſomething thicker than ordinary. This Thickneſs was occaſioned by the Swelling of the Fibres, which were as fleſhy as thoſe of the Muſcles, which happens undoubtedly in this Condition only, in order to give ſuch a Force and Motion to the Part, as is neceſſary for ſqueezing out the Egg, after it is looſened from the* Ovary, *and to puſh it into the* Matrix. *It is my Opinion, ſays this Author, that this Liquor contained in the* Tube *comes from the* Ovarium, *and that the Fibres and ſmall Lymphatick Veſſels, or others, that break to open a Paſſage for the impregnated Egg, let this Liquor flow, ſo that a Rent of the Ovary makes a Wound, and produces a Symptom which is uſeful, and perhaps abſolutely neceſſary, either for the firſt Nutrition of the Egg, or to facilitate its Paſſage into the* Matrix; *for Nature works every Thing for its own Advantage. And that which confirms me in this Opinion is, that in Females where there are ſeveral Eggs broke off at once, this Liquor is found in great Quantities. I have lately been ſo happy as to find, that in a Sow in the ſame Condition, the* Cornua *on each Side that embraced the* Ovary *contain'd each of them about three or four Ounces of this Liquor.*

The Cornua *being looſed from the* Ovarium, *and the Liquor poured out, the Egg appeared naked. It was of the Size of a Hazel Nut, ſurrounded with Liquor in the Middle of the Cavity dilated from the Tube, three Fourths of this Egg being ſlipped out of the* Ovary *by the Hole which it had made, ſo that look'd as if it held by nothing: Notwithſtanding, when I went to take it away, I found it hanging by a hard String, acroſs which run the Blood Veſſels, to ſupply it within and without. It is by theſe Veſſels that the* Fœtus *receives Matter for Growth and Nutrition, not only in the* Ovary, *but likewiſe in the* Matrix, *this String or Stem ſerving to form the* Placenta, *by clinging to the Body of the* Matrix. *It is alſo by this we form a Conception how the ſeminal Spirit of the Male is convey'd into the Body of the* Fœtus *in the Egg, to give it Motion and Fœcundity.*

An Obſervation of an uncommon Caſe of a Dropſy, *contained betwixt the Tunicks or Coats of the Womb. Taken from the* Philoſophical Tranſactions *of the* Royal Society; January, $169\frac{3}{4}$.

A Perſon, aged 44 and upwards, ſome Time after ſhe was married, had conceived, as ſhe thought, by ſome ſuppoſed Symptoms of Pregnancy, and in order to her Delivery, at the Expiration of her Reckoning, her Midwife was conſulted: Her fancied Pains came on, and ſhe thought her ſelf very near her Labour. Her Belly was grown very big, had gradually increaſed from the Time of her imagined Conception; but alas, ſhe found her ſelf deceived in her Expectation, and her Preparations for this Time all in vain. Her Illneſs ſhortly after wore off, without leaving any Prognoſtick of an approaching Birth.

Thus ſhe continued, growing bigger and more indiſpoſed, till twice the Time of her Reckoning was compleated. Thoſe whom ſhe conſulted for Help, knew not by what Means to relieve her, as not knowing what her Diſtemper was. Some thought ſhe had a Tympany, ſome that ſhe was *Aſcitical*, and others, that ſhe carried a dead Child in her Womb. She had taken much Phyſick, but without Relief, and at length made her Application to an eminent Phyſician; who, after due Enquiry into the Circumſtances, put her in Hopes that ſhe was with Child, and by taking his Preſcriptions, in all Probability ſhe might very ſpeedily be delivered of a Humane *Fœtus*, either dead or alive. Theſe Remedies were taken as ineffectually as many others, ſo that now ſhe began to deſpair of Recovery, yet lived many Months afterwards: And laſt of all, at three Years End from the Time ſhe firſt thought her ſelf pregnant, ſhe referred her ſelf to a Man Midwife, and was then put under a Courſe of Phyſick again, wherein ſhe took many powerful Hyſterick and other Uterine Remedies.

It was now without much Queſtion concluded that ſhe laboured of a *Mola*, or that a falſe Conception was engendered, by one of Nature's Aberrations, inſtead of a true one. The Cauſe being now, as was thought, found out, there remained nothing but to endeavour its Expulſion. This was attempted with no better Succeſs than formerly, ſo that after all ſhe removed into the Air, where ſhe had not continued long before ſhe languiſhed and died.

There remained nothing but the Opening of the Body, which was concluded on, in order to detect this ſo occult and contumacious a Diſtemper. We who were to make the Inſpection met with her Phyſician, and the Corps being laid as advantageouſly as might be, we began our Inciſion from the *Umbilicus*, tranſverſe the *Abdomen*, to the *Ilia*; and from the ſame Centre another Inciſion direct to the *Os Pubis*. Here was now an Expectation on all Hands of ſomething rare and monſtrous, when on a ſudden one of the Diſſectors, little thinking what was ſo near, in cutting through the *Peritonæum*, accidentally thruſt his Knife too far, and immediately there aroſe a Spring, as it were, of a limpid *Serum* or *Lympha*, as clear as Water from a Fountain, riſing up a very conſiderable Height, and with great Impetuoſity.

This put an End as well to Conjecture as Diſpute, we now fully concluding the Diſtemper to be an *Hydrops Uteri*, or a *Dropſy* contained within the Cavity of the Womb. Having emptied the containing Part of its Water, which in Quantity did ſomewhat exceed two Gallons, we proceeded to ſatisfy our

ur ſelves wherein this Deluge had been ontained. We found its Encloſure was a hin tranſparent Membrane; and yet, notwithſtanding its extraordinary Dilatation, I ould not perſuade my ſelf that it was the ntire Body of the *Uterus* it ſelf. Upon a ore ſtrict Search, when I turned this Membrane to the right Side, I perceived underneath this outward Tunick, or as I thought, dhering to it, a more carnous Subſtance. o clear this Suſpicion, the *Os Pubis* was diided, which finding very difficult to be perormed with a Knife, I finiſh'd with a ſmall aw.

I cannot chooſe but take Notice in this lace of ſome Peoples Over-Credulity, and o wonder that we ſhould be ſo eaſily perſuaded to ſet the Light of our Underſtandng in the dark Lanthorn of Authority, when e take for granted that theſe Bones, *viz.* the hare or *Pubes*, do ſeparate or part aſunder f their own Accord in Time of Travel, in rder to facilitate the Birth of the *Fœtus*.

The *Pubes* being divided, we paſſed in a robe through the *Pudenda* into the *Vagina teri*, and having traced it as far as it went, y looking into the *Pelvis*, and ſearching r that carnous Subſtance I have already oken of, we found it to be nothing leſs than the *Uterus* it ſelf; when cutting into its Body, we perceived the End of the Probe already entered into the *Cervix* or Neck thereof; ſo that what ſeemed to us ſtrange, we were at length aſcertained of the Truth, and convinced, that the aforeſaid Water was contained in the external Tunick of the Womb, whoſe great Weight had thruſt the Body thereof perfectly on one Side, and hindered an Admiſſion of Search from the *Vagina* towards the *Fundus Uteri*, the *Cervix* thereof being kept cloſe, as in a true Conception.

One of the great Indications of this Woman's Pregnancy, was a Flux of a whitiſh or pallid Humour to her Breaſts, which ſhe cou'd ſqueeze out at Pleaſure, and thought it to be no other than Milk generated therein, in order to the Nutrition and Conſervation of a future Birth. She had likewiſe laboured the greateſt Part of the Time under a Suppreſſion of the *Menſes*, whoſe Reflux to the Breaſts, when an Alteration had been induced by its Glandules, might, as I conjecture, iſſuing from the *Papillæ* under a ſubalbid Form, be taken for Milk, and give Grounds of a Suſpicion that ſhe had conceived.

The Conduct of Nature in forming an Animal from an Egg, &c. By St. Hilaire.

TO diſcover the Method which Nature purſues in forming an Animal from an Egg, we ought to conſider, ith *Fabricius ab Aquapendente* and *Harvey*, e Hen's Egg, both before and during the me of Incubation or Sitting. Before Inbation, we find in the Tunick of the olk of the Egg, a little white Spot, in ape of a Circle, that is like a ſmall Len, and is called a *Cicatrice*. During the Sitg, the *Cicatrice* dilates it ſelf, and ſtretches e firſt Day into ſeveral Circles, and the ond Day we may obſerve a certain clear d ſhining Liquor finer than Chryſtal, ich, for a certain Reaſon, is called a *Jelly*. The third and fourth Day we may perceive in that Jelly a Streak of florid Blood, and the *Punctum ſaliens* in the Middle of the Jelly, which is the firſt Formation or Diſcovery of the Heart. We may take Notice afterwards, beſides that Point, of ſomething thick and whitiſh like a Cloud, divided into two Parts, the larger whereof is the Matter for the Head, where we may ſee four little Bladders, which are the *Brain*, the *Cerebellum*, and the two *Eyes*. The other Part is much leſs, and underneath is repreſented the Keel of a Ship by the Spine of the Back, and by Degrees you will ſee the Arms and the Legs. In ſhort, the *Viſcera* cling ſuc-

ſucceſſively to the Veſſels that convey and incloſe the Blood, and ſo perfect the *Fœtus*.

Malpighius obſerves, that the *Fœtus* is incloſed or wrapped up in the *Cicatrice* before Incubation; ſo that the Head, the Spine, and their Appendices, are plainly diſtinguiſh'd in the ſmall Tunick that ſwims in the Jelly of the *Cicatrice*, as the *Fœtus* in the *Amnios*; and likewiſe, that the Parts of the Chick pre-exiſt in the Egg, and precede the Incubation; in the ſame Manner as Seeds, or the Eggs of Plants, which incloſe or contain in them certain Roots or Buds, from whence the Plant grows, which being decay'd or rotten, all the Virtue and Hopes of that Generation is deſtroy'd. The Shoot or Graft is nothing elſe but the Deſign or Plan in Miniature of the Plant; ſo all the Parts of the Chicken are potentially in the *Cicatrice*. They encreaſe ſucceſſively, according to the Order of Time, from the firſt Impregnation of the ſeminal Spirit, according to the Intention of the Creator. He concludes conſequently, that the Head, the Brain, the Marrow, and other Parts, appear ordinarily in the Egg, or in the Cicatrice before the Formation of the Jelly, and before the Motion, or its Change into Blood, and that the Chicken is in the Egg, with the Tunicles or Coats, before its Excluſion from the Hen.

The *Matrix* or Womb of a Woman with Child being opened, we preſently ſee that fleſhy Subſtance which *Fallopius* called *Placenta Uterina*, and others *Hepar Uterinum*, the Burden or After-birth; ſome call it the Womb-Cake. This *Placenta* is a fleſhy *Viſcera*, and very ſoft, being compoſed of a great Number of very ſmall Veſſels, and of Blood, by Means of which the *Fœtus* is tied to the *Matrix*, chiefly at the Bottom thereof. There is uſually but one when there is but one *Fœtus*; but in a double Conception nothing is more certain than that each *Fœtus* hath its diſtinct *Secundinæ*. The Subſtance of this Part is peculiar to it ſelf. It is ſoft, lax, eaſy to break, uneven, in ſeveral Wrinkles or Folds. It is altogether fibrous, and wove with an infinite Number of fine Filaments, and ſmall delicate Veſſels, tumid with coagulated Blood ſpread through the whole, juſt like the *Parenchyma* of the Liver. 'Tis of a dark or deep red Colour, not like the Spleen, but ſomething redder, and ſeldo pale. The Shape is ſomething circular, bu the Circumference unequal. Its Size ar Thickneſs vary according to the Diſpoſitio of the *Fœtus* and the Parent. The Surface the *Placenta* is on the concave Side, towar the *Fœtus*, even and ſmooth; but on the Co vexity of it, it is rough, ſpongy and uneve by which Means it ſticks to the inward Par of the Womb, which at that Time affor Nutrition plentifully to all the neceſſa Parts. It receives into its Middle, or ther abouts, ſometimes a little on one Side, a ſometimes a little on the other, the *Nave ſtring*, which is tied to it with the Veſſels the Intermediation of which the neceſſa Communication is eſtabliſhed which is b twixt the *Placenta* and the *Fœtus*. The Ve and the two Umbilical Arteries inſert ther ſelves into the *Placenta* by a Multiplicity Roots, by which they mix and interwea themſelves into the very Subſtance there after a moſt wonderful Manner.

The *Placenta* is tied to the *Matrix* by Mea of the *Cotyledons*, which are nothing but t Elongations of the Veſſels or other fleſ Advances or Teats of the Womb. Th has ſome Reſemblance to the Herb *Cotyled* which the *Latins* call *Umbilicus Veneris*; they are called *Acetabula*, becauſe like ſm Veſſels or Sawcers in which they were u to bring Vinegar or other acid Liquors the Table. During the Time of Gravitatio we may ſee in the *Matrix* ſeveral ſmall N ples of a ſtrong delicate Contexture, wh are united with the Veſſels of the *Placen* Theſe Nipples are compoſed of many ſm Pellicles, that form a reticular or Net-l Body, and this is made of little round long Bodies of an Aſh-Colour, which is l the Caul of Fiſhes. There are ſeveral Bl Veſſels that belong to the *Placenta* and *Chorion*. The Uſe of the *Placenta* in the W man, is partly to ſuſtain or ſupport the lac umbilical Veſſels, and carry on the Comm nication of Parts, and partly to prepare a p ticular Nutrition, that may be proper for adjacent Parts, as well as the Nouriſhment the *Fœtus*.

After the *Placenta*, there immediately lows two Membranes that wrap up the *Fœ* and incloſe him as it were in an Egg, wh

becauſe they are join'd together, come together with the *Allantoides* and the *Placenta*, out of the Womb, after the Infant is born.

The *Chorion* is the external Membrane that ſurrounds the whole *Fœtus*. It is thick, interwoven of ſeveral Fibrils in the Nature of Threads, internally a little uneven or rough, on the Outſide here and there laid in with a ſmall Matter of Fat, and at the Place where it is fixed to the Bottom of the Womb by Means of the *Placenta*, it has ſeveral Blood Veſſels that come from the *Placenta* and the umbilical Veſſels.

The *Amnios* is the internal Membrane that covers the *Fœtus* moſt immediately. It is extreamly thin and delicate, ſoft, ſmooth, and tranſparent, ſeparated from the *Fœtus* by a pretty good Diſtance, and ſupplied with very fine Veſſels, that are ſcarce viſible, which proceed from thoſe of the Navel. Beſides theſe two Membranes, *Needham* diſcovered a third very thin one, that is tranſparent, concave, and without Veſſels, ſeated betwixt the *Chorion* and *Amnios*. It is very properly called the Urinous Membrane, and is eſtabliſhed with good Reaſon inſtead of the *Allantoides* of Brutes, becauſe the Urine of the *Fœtus* may be collected betwixt that and the *Chorion*, and ſo preſerved till the Time of Excluſion.

It happens ſometimes in the Birth, that a Part of the *Amnios* is broke, and remains fix'd to the Head of the Infant, who is born with it, as if he had a *Cap*, *Coif*, *or Caul*, on; from whence thoſe Children are ſaid to be wrapped in their Mothers *Smocks:* And the Matrons at that Time are wont to preſage good or ill Fortune to the Child, according to the different Colour of the Cawl, which they preſerve with Care, to make good their Foreknowledge, and to ſtrike Terror into the Parents, whom ſometimes they perſuade into a Belief, that without that be dried, powdered, and given to the Infant, it cannot proſper.

When a Woman has conceived Twins, theſe are incloſed but in one *Chorion*; nevertheleſs each particular *Amnios* that contains the Milky Humour is diſtinct, as it is uſually met in Walnuts and Almonds, in which tho' two Nuts ſeem to be incloſed in one Shell, nevertheleſs each hath a particular Membrane or Skin, by which it is ſeparated from the other. If it happens that either of the *Amnia* of the Twins break by a Stroke, Bruiſe, or any other Accident, or perhaps that they were not diſtinct at firſt, then the *Fœtus's* unite and ſtick together, according as they touch one another, and by this Means Monſters are produced. It likewiſe often happens, that each *Fœtus* is wrapped in a different *Chorion*.

As it happens ſometimes that in Hens Eggs we ſee two Yolks, with their Whites divided by a very fine thin Skin, but incloſed in one hard Membrane or Shell, and that ſuch Eggs, tho' fæcundated by the Communication of the Cock, being ſet under the Hen, ſhall rarely produce two diſtinct Chickens rightly formed, but one only, and that deformed and monſtrous, having four Wings, four Feet, two Heads, *&c.* and that by reaſon that the Membranes that ſhould have divided them are broke, and the two Chickens cloſe ſo intimately, that they can make no other than one monſtrous Production. The ſame Thing likewiſe may happen in the Eggs of Women, that two Eggs being wrapped together under one Covering, only that makes the *Chorion*, and then if the Membranes of the *Amnios* are alſo ſolid, the Twins keep ſeparate one from the other, the Navel Strings which proceed from each of them inſert themſelves together into one *Placenta*, ſticking to the *Chorion*, and then being arrived at their Maturity, they iſſue forth at the Birth ſeparately, each in particular, and after the Birth of the laſt *Fœtus* comes the *Secundine* which has contained them both in the Womb: But if the Membranes of the *Amnios* are found weak and tender, and that they break them, the Twins reſt or bear immediately upon one another, they ſtick cloſe becauſe of the extream Softneſs of their Bodies, and being thus join'd, they are puſhed out at the Birth together, as monſtrous.

We obſerve, that the *Chorion* and *Amnios* are generated in the *Ovaries* from the Seed, and that they encreaſe and ſtretch themſelves more and more by their Nutrition; that theſe two Membranes, which at firſt Sight are remote, or at ſome Diſtance from one another, occaſioned by a ſmall Quantity of Liquor contained betwixt them, as we may ſee in a *Fœtus* of ſix Weeks or two Months old, which proceeds from the Thickening of

it, that fills the whole Space, and joins it ſelf ſo ſtrictly one Part to the other, that it is difficult to ſeparate them: So that all that the Ancients or others have ſaid of the Sweat or Urine that is found in theſe Incloſures are Errors, which do not deſerve refuting. For ſince the two Membranes touch each other, Where can theſe Liquors be contained? And if we ſee any Thing run out in opening theſe Membranes, it is when the *Amnios* is opened.

As for the Liquor that may flow ſometimes a few Days before the Delivery, we obſerve that it does not proceed from the *Amnios*, ſince we always find a Quantity contained in that Covering, but that it comes from the Waters that are collected betwixt the *Amnios* and the *Chorion* when theſe two Membranes are divided; for the Fibres of the *Chorion* are not ſo relaxed, that they admit their Pores ſo open as to give Paſſage to the Humidity that is by Degrees collected in the Opening betwixt the two Membranes; but when either of them are torn off, the Water freely flows out.

The Ancients believed that the Liquor of the *Amnios* was an Excrement, and that it was the Sweat and Urine of the *Fœtus*; but the Moderns have ſhewn, that this Humour is prepared for the Nutrition of the *Fœtus* by the Mouth. *Harvey* hath proved it by many Experiments. He makes it appear, that this Liquor of the *Amnios* is compoſed of ſerous Particles, and others that are Chylous and ſpirituous, the laſt of which ſerve for Nouriſhment to the *Fœtus*. This Opinion is very reaſonable, for in the laſt Months of Gravitation, this Liquor is almoſt dried up. It is ſweet, and of an agreeable Taſte, which ſhews it to be no Excrement. If it be ſet over the Fire, it will thicken into a Jelly, which it would not do, if it came from Urine.

But the greateſt Difficulty conſiſts in determining from whence this Liquor comes. Some will have it, that it comes from the *Matrix*; ſome, that it runs croſs the Membranes, and is collected in their Cavities; and others will have it come by the ſmall Branches of the umbilical Arteries that run through the inward Part of the *Amnios*: Others again ſay, that it ariſes from the Sweat of the *Fœtus*. In ſhort, there are ſome, as *Harvey*, *Drelincourt*, and other Moderns, propoſe an Opinion more agreeable to Reaſon, and founded on Experience. 'Tis a Thing known to every old Woman, ſay they, that Children, when they are new born, have their Breaſts always full of Milk; ſo that it is ſometimes ſo plentiful, they are obliged to preſs it out, leſt without this Precaution the Breaſt ſhould harden, and then ſuppurate, as the Breaſts of Nurſes do when the Milk is coagulated therein. The Liquor of the *Amnios* then is that ſerous Milk which runs from the Infants Breaſts; for how ſhould they be ſo full of Milk, if they had not met with it in the *Amnios*. This Liquor continues to be filtred through the Glands of the Breaſt, during the Time that their Texture is ſo relaxed as to give Paſſage to it; but afterwards, when they are lock'd up or cloſed ſo that they cannot filter any more, this proceeds from the *Serum*, that is incapable to ſerve for any further Nouriſhment for the *Fœtus*. So in the laſt Months we find the Liquor of the *Amnios* clear as common Water, that if it be put over the Fire will not thicken into a Jelly, becauſe it has loſt all thoſe nutritious Particles whereof we ſpoke.

The Membranes that cover the *Fœtus* being laid bare, the Navel-ſtring preſently appears to View. The *Latins* call it *Umbilicus*, derived from the Word *Umbo* a Bunch, or the Eminence or Riſing in the Middle of the Girdle, becauſe it is ſeated in the Midſt of the lower Belly, where it is the Centre. 'Tis a membranous, crooked and uneven Pipe, of the Length of an Ell or thereabouts, and of the Size of ones Finger, which ſprings from the Middle of the *Abdomen* of the *Fœtus* to the *Placenta*. 'Tis neceſſary it ſhould be thus long, that the Child might flote in the Womb, and have the Advantage of Motion in its ſeveral Circumvolutions or Turnings.

The *Navel-ſtring* uſually turns back towards the Breaſt, and leans to the Left Side. It ſtretches from Head to Foot, and from thence advances to the *Placenta*, where it is join'd by the Veſſels and Membranes which it contains. Sometimes towards the Right Side it mounts to the Neck, twiſts round it, and then deſcends again to the *Placenta*. It is made up of Veſſels, and a ſmall Pipe called

led the Small Gut. The Veſſels are named *Umbilicous*. Thoſe that proceed from the *Fœtus* are four; one Vein, two Arteries, and the *Urachus*. The Vein is larger than the Arteries. It takes its Riſe from the Liver of the *Fœtus*, from the Fiſſure of which is afterwards formed the Origine of the *Vena Porta*, whereof it is a Sprig, and from that paſſing croſs from the Navel, it goes by the ſmall Inteſtines to the *Placenta*, into which it is inſerted, and implants it ſelf by an Infinity of Roots. This Vein carries the Blood to the *Fœtus*, which is prepared in the *Placenta*, and it has ſeveral *Valves* which are open towards the *Fœtus*, and ſuſtain the great Efflux of Blood, hindering its Return into the *Placenta*. The *Umbilical Arteries* are two, which take their Origine from the interior Iliack Branches of the *Aorta*, or great Artery, immediately from the Beginning of its Divarication, from whence it is carried upwards towards the Sides of the Bladder, and having met with the Vein that accompanies it, they enter together into the ſmall umbilical Inteſtine. It is by theſe Arteries that the Blood and vital Spirits are carried from the *Fœtus* to the *Placenta* by the Impulſion of the Heart of the *Fœtus*, in order to diſſolve, and ſtill more rareſy, after a peculiar Manner, the Blood which is brought by the ſmall Veſſels from the *Matrix*, in order to its acquiring a greater Perfection.

A Modern Author explains the Uſe of the umbilical Veſſels after this Manner: The Arteries of the Mother, ſays he, carry a certain Quantity of Blood into the *Placenta*, which being there lodged, is received by the Branches of the umbilical Vein, which conducts it into the *Vena Porta*, to be filtred through the Subſtance of the Liver of the Infant before that it enters into the *Vena Cava*, which carries it into the Right Ventricle, from whence it paſſes into the Left by the *Foramen Ovale*, afterwards to be diſtributed to all the Parts of the Body by the Arteries. The Superfluity of this Blood is brought back by the two umbilical Arteries, where being diffuſed, it is received by the Veins of the Mother, which are ſpread abroad, and carry it back into the large Veins, to circulate with the whole Maſs; and ſo it is made one continued Circulation from the Mother to the Infant, and from the Infant to the Mother. One certain Sign that it is done this Way is this, that in touching the *String* of the Infant new born, we may perceive the ſame Pulſation as from the Arteries, which makes it appear that the Blood that fills the umbilical Arteries is the ſame that comes from the Heart of the Infant, and not that of the Mother, as was believed ſome Time ago.

To theſe three umbilical Veſſels we may add the Lacteals, by which the Milky Liquor or Chyle is conveyed from the Cells of the *Matrix* into the Capacity of the *Amnios*. The *Urachus* or Urinary Veſſel is the next that belongs to this Part: It is a ſmall, thin, membranous, long and round Body, having a little Opening or narrow Paſſage, and riſes from the Bottom of the Bladder, betwixt the Artery and the Vein, to the very Navel. *Avicen* and *Fabricius ab Aquapendente* ſay, that the *Urachus* does not end at the *Navel*, but that, conjointly with the Vein and the umbilical Arteries, it paſſes along with it, to wit, even to the Membranes that incloſe the *Fœtus*; that in Brutes it opens into the *Allantoides*, and in Men enters the *Chorion* and the Urinary Membrane, and that it carries the Urine thence into the Bladder of the *Fœtus*.

The Ancients believed that the *Urachus* ſerved as a Pipe to evacuate the Urine of the Infant into the Membranes; but the Moderns, who have found no Hollow therein, cannot believe it hath any ſuch Uſe. Beſides theſe Trials, Reaſon will convince us that the Infant does not urine in the Mothers Belly, ſince the Chyle that is brought to it with the Blood, for its Nutrition, is purified before it comes there; and beſides we have found other Reaſons, from the Seroſity in which the *Fœtus* ſwims, without ſearching into the Urine. But the true Uſe aſſign'd to the *Urachus* is, to ſuſpend or hold up the Bottom of the Bladder, and hinder it from deſcending or falling upon the Neck, in order to make it capable of holding a great Quantity of Urine.

The umbilical Veſſels, for greater Security, are wrapped about with a Covering called the *Small Gut*, or the *Cord*. This Twiſt or String is a membranous, long, round, hollow

Part, moderately thick, compoſed of a double Coat, that covers and unites together the umbilical Veſſels, with which it is twiſted like a Cord. We find in the Cavity of this a certain Milky Humour, which it draws from the ſmall Cells of the *Matrix*, and from whence afterwards it deſcends by Degrees into the *Amnios*. This Liquor, after the *Fœtus* is born, flows from the Womb uſually thick, and like Jelly, if ſet in the cold Air. There are in ſeveral Parts of it Knots almoſt like little Bladders or Bliſters, filled with a whitiſh Juice. *Wharton* believed, with Reaſon, that theſe Knots were like little Nipples, by which the lacteal Juice was drawn into the Capacity of the *Navel ſtring*, and afterwards diſtill'd into the Cavity of the *Amnios*. Superſtitious old Women uſed to predict the Number of Children from the Number of Knots on the String; and if there were few or none, that then the Woman would have no more: So likewiſe, according to the Diſtance of the Knots, they uſed to reckon the Diſtance of Time before the Mother would bring forth another Child.

The *Fœtus* having ſtayed nine Months in the Womb, it breaks its Priſon, to take the Benefit of the Air, which it ſo much wants; and then, by the Care of the Mother, and the Strength of its Conſtitution, it encreaſes daily by Feeding. It may be asked, Why an Infant cannot remain longer in the Womb than nine Months? We anſwer, Becauſe it wants a greater Quantity of Air to make the Blood circulate than it receiv from the Mother; and that the Lungs a Heart increaſing ſo conſiderably, endeavo to enlarge their Motion, which being ſtron er, and more vigorous, brings the Pare into Labour, and ſometimes the Infant is ſtrong as to exclude it ſelf without much, any, Pain to the Mother. Mr. *Drelincour* a very able Anatomiſt, is of quite anoth Opinion. He ſays, that the Child havi never breathed in the Mother's Womb, is n capable of forming any Deſire thereof: B ſides, by comparing the Lungs of a *Fœt* who died before the Birth with one th lived ſome Hours after, he aſſures us, th he found the firſt of a livid Colour, and loaded with ſerous Matter, that it ſunk the ottom of the Water like a Stone. In ſtead of that, the other's was of a livel Colour, and ſo light, that throwing it int Water, it would riſe again preſently: An thus, ſays he, we may diſcover the Wicked neſs of thoſe who ſtrangle their Children the Birth, and ſay, to avoid the Puniſhmen of the Law, that it came dead into th World. Thus moſt Anatomiſts now conclud that the Infant ſtruggles not to come int the World for freſh Air; but rather, th he is diſturbed by the Thickneſs and Acr mony of the *Serum* in the Womb, that raiſ Gripes in the poor Infant; and that this Ac ceſs of Cholick Pains affects the *Matrix* the Mother; ſo that both being afflicte they join together their utmoſt Efforts to b parted.

Of the Diſeaſes ſubject to the Parts of Generation i Women, *and firſt of thoſe of the* Womb. *Fro Monſieur* St. Hilaire, &c.

THE Diſeaſes of the Womb are divided into ſuch as happen to the *Vagina* or Neck of the *Matrix*, *Tentigo*, the fleſhy Excreſcencies, the Straitneſs or Contraction, the Deſcent or Falling down, Puſtules, Condilomes, Hæmorrhoides, U cers, Rhagades, and Warts. Thoſe whi attend the Lips of the Natural Parts are, C runcles, Itching of the *Vulva*, and the T mor of the Lips; and ſuch as happen to t

Mau

Matrix it ſelf, as Intemperance, Wind, Dropſy, Inflammation, *Scirrhus*, falling down, *Sphacelus*, Wounds and Ulcers. The Symptomatick Diſeaſes of the Womb are, Suppreſſion and exceſſive Fluxes of the *Menſtrua*, an Uterine Flux, the *Gonorrhœa*, pale coloured Fluxes, Suffocation of the Womb, *Furor Uterinus*, Barrenneſs, the Mole, a depraved or vicious Conformation of the *Fœtus*, Monſters, Abortion, dead Child in the Womb, and difficult Birth.

The *Tentigo* is an Inflammation of the *Clitoris*, cauſed by abundance of Spirits and Blood which are convey'd to that Part, and which diſtend it ſo, that Women have a Deſire to make Uſe of it. When this Indiſpoſition is without Pleaſure, it is called a Priapiſm, and Salaciouſneſs when with Pleaſure. In this Diſeaſe, the *Clitoris* grows large, and is ſwelled up, and erects like a Yard, and is ſometimes ſo long, that it enters the *Vulva*. This Inconvenience is not dangerous, but it is lewd and wicked.

The carnous or fleſhy Excreſcencies of the *Vagina* are called Tails, becauſe they proceed ſometimes out of the Parts hanging down like Tails. They are occaſioned by abundance of *Lympha* and nutritious Juice, which make Obſtructions in the internal Membrane of the *Vagina*; ſo that the Fibres of that are always receiving new Nouriſhment, by which Means they grow and extend themſelves conſiderably, in covering ſometimes all the *Vagina*. There are ſome Women more ſubject to theſe Excreſcencies, becauſe the Veſſels of the *Vagina* are very large, from whence it comes that they are eaſily dilated by the Plenty of nutritious Juice. Theſe Excreſcencies are ſoon known, becauſe they fill a Part of the *Vagina*, and therefore the Women are ſenſible of their Growing. They are more deformed and inconvenient than dangerous.

The Narrowneſs of the Neck of the Womb may proceed from ſeveral Cauſes; for either it may come from the Birth, a Stone in the Bladder may compreſs it, or a Tumor in the *Rectum*. In ſhort, from the *Carnoſities* and the *Fungus* that may ſtop the Mouth. When the Straitneſs or Contraction is entire, there happens a Suppreſſion of the *Menſes*, they perceive a weighty Pain, ſometimes the Urine is ſuppreſs'd, and ſometimes it cauſes a *Strangury* and a *Dyſury*: In ſhort, it is eaſily known by examining the Part. The Straitneſs that comes from the firſt Conformation of the Part is not to be cured. If the Paſſage of Urine is likewiſe ſtop'd, we muſt proceed to Operation.

The Deſcent of the Womb is nothing but an Extenſion or Lengthening out of the *Vagina*, when it hangs below the Lips. It happens ſometimes after Labour by the Ignorance of the Midwife, who catches hold of the Foldings of the *Vagina*, miſtaking it for the After-Birth: This makes it that the Neck of the Womb ſeparates from the Parts to which it adhered, ſo that you perceive it hang out of the Body. It happens ſometimes in Girls, either by an Inflammation, or a Relaxation of the Foldings of the Membrane of the *Vagina*, which always proceed from Obſtructions; or rather, it may come from Ulcerations, which efface and wear off the Wrinkles of the *Vagina*.

If the Tumor is fixed on the Lips of the *Vulva*, or near, we call it only a *Deſcent*. It does not appear when there is a ſmall Tumor that is upon the Lips, or a heavy Body of the Size of an Egg. If the Tumor is outwardly, it is properly that which we call a Falling down: It is bigger or leſs, and leaves a Hole in the Middle, which the Ancients miſtook for the internal Orifice of the Womb. When all the Neck of the *Matrix* is relaxed, ſometimes there is no Hole, and the Tumor is only round, and then there is nothing but ſome Wrinkles from the Neck of the Womb, which may be reſtored. They perceive at the Beginning a Pain, with Tenſion towards the Loins, and Hypogaſtricks, occaſioned by the Weight that lies violently on the Parts. Sometimes the Fever ſucceeds, ſometimes Convulſions; ſometimes the Subſtance that deſcends is corrupted, ulcerates, and ſometimes gangrenes.

The true Deſcent of the Womb, produced by ſome external Violence, is almoſt always incurable; for this Violence happens not, without breaking and rending the large Ligaments, the Conſolidating and artificial Reunion of which is not very probable. A freſh Deſcent of the *Pudenda* only, and proceeding no further, is eaſy to cure, eſpecially in young People; but if the Malady is inveterate, if the Air hath conſiderably al-

ter'd

ter'd the Subſtance, if the Patient is aged, it is very difficult to effect. It is rare that the Falling down of the Neck of the Womb is mortal; it is only dangerous by the Ulcers, and the Stench that ſucceeds. The Fever, the Pain, Convulſion, and other the like cruel Symptoms that happen, make it mortal.

Puſtules at the Neck of the Womb are ſmall Tubercles or Riſings in the Fleſh, that come from Pain and Itching; and the *Condylomes* are other Sort of Tubercles in the Shape of Knots. Theſe Tumours are attended with a burning Heat, that gives a great deal of Pain. The *Puſtules* are always cauſed by an acrid and viſcous *Lympha*, eſpecially when the Matter that is ſeparated by the Vaginal Glands is become acrid and acid. The *Condylomes* are occaſioned by the Obſtruction of the Vaginal Glands, or by the Wrinkles of *Vagina*. Theſe Indiſpoſitions are common in Venereal Caſes: They are then attended with Inflammation, with Pain, with Heat and Hardneſs. There are others that are ſoft and without Inflammation, and which have a great deal more Affinity to the Evil.

The *Hæmorrhoides* of the *Vagina* proceed from ſmall bloated Tumours, that ariſe from Pain: They make the Women look pale, and cauſe a Laſſitude: They have ſome Analogy to the *Hæmorrhoides* of the *Anus*. There are thoſe which bleed, and thoſe which do not; ſometimes they are attended with the Whites. Theſe Diſorders are produced, like thoſe of the *Anus*, by a thick coagulated Blood, from an Acid which reſts in the Veſſels of the *Vagina* dilating them; and in the End, the Blood ferments, becomes acrid and corroſive, tears the Veſſels aſunder, and at laſt cauſes an *Hæmorrhage*. The *Hæmorrhoides* of the *Vagina*, that come from Blood, are much eaſier cured than thoſe that do not run at all.

The *Ulcers* of the *Vagina* proceed either from an external or an internal Cauſe: Sometimes it is from taking of Medicines, but rather from a difficult and tedious Delivery, that occaſions theſe Ulcers. The internal Cauſes are, the *After-burthen gangrened*, the Cleanſings ſtop'd, the Pox, Abſceſſes; in ſhort, all Sorts of Obſtructions caus'd by an acrid *Lympha* are capable of forming Ulcers. Theſe are known from their Pain and their Itching, and the *Pus* that flows, which is ſometimes mixed with Blood, particularly in the Monthly Purgations; in making Urine, they perceive acute Pain. If the *Urethra* is likewiſe ulcered, there is a great Heat of Urine, there ſucceeds a ſlow Fever with Shiverings. The *Ulcers* of the *Vagina* are not to be neglected, becauſe the nutritious Liquors grow ſharp by their Stay, and ſo become acrid and corroſive like *Aqua fortis*; all the Fibres being cut, the Part is deprived of its Nouriſhment, and is ſubject to gangrene. It is very difficult to cure the inveterate Ulcers that lie deep in the *Vagina*, eſpecially if joined with the *Pox* and the *Scurvy*.

The *Fiſtula's* of the *Vagina* commonly ſucceed obſtinate Ulcers: They are known by the ſame Signs as others, from their Calloſity, and a ſtinking *Sanies* that flows from theſe *Fiſtules*. Sometimes they penetrate into to the Bladder, and ſometimes into the *Anus*.

The *Rhayades* or Chaps are from ſmall Ulcers that break the Wrinkles or Folds of the *Vagina*, and proceed ſometimes from a difficult Labour, which occaſions a Dilaceration of the Part; or elſe they come from rubbing too roughly upon the Lips, or from Excoriation of ſharp Humours, or by Inflammations, Warts, or *Condylomes*.

The *Warts* come upon the Lips and in the *Vagina*, which do not differ from thoſe of the *Glans* and the *Prepuce* in Men. They are produced by an acrid *Lympha* lock'd up in the Glands of the *Vagina*: Theſe Warts are ſometimes hard and callous. The *Condylomes* and *Warts*, which are before in the Neck of the *Matrix*, are very troubleſome to cure: it is much eaſier to remove thoſe that are external: They likewiſe create great Uneaſineſs when occaſioned by the Pox. Beſides they are hard to cure in Women who have a Stoppage of their Terms, where they are full of Humours, or ſcorbutick; becauſe the Blood is devoid of volatile, and the Fluids are all thick, glemey and acid.

Caruncles and *Excreſcencies* of Fleſh come ſometimes upon the *Labia*, and ſometimes in the very *Vulva*, where they fix with a great many ſmall Roots, that it is no eaſy Matter to extirpate them. They proceed from the Acrimony of Juices, which coagulate in the

Glands

lands, and then being extravaſated, occa- on theſe Excreſcencies of Fleſh. Theſe *Ca- cles* are diſcover'd by examining the Part, by the Relation of the Patient. Some- nes they are fungous, and cauſe great In- nveniency to the Approach of the Parts d the Flux of the Courſes; from whence ſe ill Symptoms, eſpecially if the Carun- es are large; becauſe they compreſs the *rebra*, and cauſe a Suppreſſion of Urine.

The Itching of the *Vulva* is very ſenſible, m a pricking Pain therein, which occa- ons the Woman to ſcratch immoderately, if ſhe was afflicted with that Itch called e *Pruritus*: If it laſts long, there ſome- nes happen an Inflammation and a Fever. his Itching is caus'd by the acrid and vola- e Salts, mixed with alkaline Particles, that ment together in the Contexture of the *lva*. It is this light Fermentation that itates the nervous Fibres, and that preſent- raiſes this ſoft Pleaſure; but when the quors are full of more rigid ſaline Parti- s, the Itching becomes inſupportable, eſpe- lly in the Night, when the Body is warm, d the Pores open. It is obſervable, that d Women are more ſubject to theſe Itch- s than young ones; becauſe their Blood much fuller of fixed Salts, ſince their na- al Courſes have left them, and that their od is leſs pure. It is for this Reaſon that s more apt to ſtop in the Glands of thoſe rts: And perhaps they are theſe Itchings d Titillations that make Women who are t the uſual Courſe of Nature more wan- than before. The Itching of the *Vulva* nothing dangerous in it; but it is very ubleſome, becauſe it hinders the Night's t, by reaſon the acrid Salts ferment and the Pores of the Skin as they paſs thro' m, being raiſed to the Surface by the Heat the Bed. If this Itching comes not from enereal Cauſe, but is a natural Production the Humours, the beſt Remedy for it is oyment, or the Act of Venery.

he *Tumour* of the Lips may come from a ruſion, which may ſtop the nutritious uors; or from their Acidity, which re- ns in the cutaneous Glands of the Lips. ſe Obſtructions put a Check to the Fluids ſhould come to the Part: It is form'd groſs Tumours that are common to men afflicted with the Pox, becauſe the Blood of pocky Patients is full of acrid and fretting Salts, that coagulate the *Lympha* in the Glands. This Tumour is eaſy to know. That which comes from a Contuſion, or ſome other external Cauſe, is ſooner cured than that from a Pox: That which is hard and ſcirrhous'd is difficult to cure.

The *Inflammation* of the *Matrix* is an Obſtruction very like the reſt, occaſioned by the Acidity of the nutritious Juices. This Diſeaſe is perceiv'd by the Pains in the Groin and the Breaſts, by the continued Fever, by the *Nauſea* and Vomiting, by the Suppreſſion of the *Menſes*, Urine, Excrement, by inſupportable Thirſt, Fainting and Coldneſs of the extreme Parts, by the *Delirium* and Convulſions that happen ſometimes; in ſhort, by the Tumour in the *Hypogaſtrium*, in which the Patient perceives a burning Heat, with a Tenſion, Weight, and a vaſt Pulſation, which increaſes when you touch it; and when you compreſs it, it yeilds a little. If the Inflammation changes into *Pus*, all the Symptoms increaſe, and diminiſh when the Suppuration is made: If it determines or goes off by Reſolving Medicines, the Accidents as well as the Tumour decreaſe by Degrees.

This Diſeaſe is very dangerous, eſpecially if attended with ugly Accidents, and the Gangrene, and if it happens during Gravitation. It is leſs dangerous when it goes off by Reſolution, and we may obſerve when it ſuppurates: It is to be wiſh'd that the Abſceſs would open towards the Cavity of the *Uterus*, that the *Pus* might have a free Paſſage, and then the Patient might be well cured from the Inflammation.

The *Sphacelus* of the Womb ſometimes ſucceeds the Inflammation. It is an entire Obſtruction of all the Veſſels of that Part, ſo that the Circulation is totally interrupted, and the Part neceſſarily ſuffers a Mortification. This Diſeaſe is attended with a ſtrong Fever, and a Pain much like what we feel in the Stone in the Kidneys, *Deliriums*, Convulſions, particularly when the Infant is dead in the Womb and corrupted; in fine, we obſerve the Part becomes black, ſoft, ſtinking, naked of Hair, and without Senſe.

The *Scirrhus* of the Womb is nothing elſe but a Tumour harden'd in the Glands and Veſſels of the Part. It is advantagious to make

make uſe of cold aſtringent Medicines in an Inflammation of the *Matrix* before it comes to a *Scirrhus*. This Diſeaſe is uſually known by a large hard Tumour, and without Pain, from the left Side of the Navel. In ſome Women the Belly is ſwell'd as if they were with Child, which proceeds from a Dilatation of the Womb. We may diſtinguiſh the *Scirrhus* from the *Mole*, in that the *Menſes* flow diſorderly in the *Mole*, if they are not ſuppreſs'd, and the Breaſts ſwell with Milk. Inſtead of that, in the *Scirrhus* the Purgations are regular, and the Breaſts become dry and ſink away. This Malady is very dangerous, and eaſily degenerates into a *Cancer*, eſpecially if the Body is *Cacochymick*.

Ulcers of the Womb commonly ſucceed an Inflammation that is ſuppurated: They yield a fœtid Matter: We are ſenſible of great Pains from the *Hypogaſtrium:* Sometimes they come from Convulſions; and if the *Sphacelus* meets it from the Womb, it will ſtretch ſometimes to the very outward Parts.

We may know the *Matrix* is wounded, when the Pain is communicated to the Groins and the Thighs, becauſe of the Ligaments, and the Connexion that there is with the *Peritonæum*; when the Blood flows at the Wound and by the Privy Parts, when it is follow'd by Vomiting of Bile, when it is Pain to them to ſpeak and they faint away, and when they are tormented with Pains in the Head and Eyes, from the great Sympathy there is with the Brain. This Wound is very dangerous, particularly in the laſt Months of the Burthen, wherein the *Matrix* is all ſpongy, and full of nutritious Juice, and the Veſſels loaded with Blood.

The *Inflation of the Womb* or *windy Mole* comes from the Air being pent up in that Cavity, which ſwells or blows it up after a ſurprizing Manner; ſo that not only the Belly riſes by Degrees, but the Monthly Courſes ſtop at the ſame Time, or elſe flow but very little, and ſometimes Milk is found in the Breaſts, which eaſily impoſes on Women, and then they firmly believe they are with Child, without ſuffering themſelves to be undeceived by the Length of the Time, that laſts a Year, and ſometimes two. In the End, they are deliver'd of ſome Wind, that goes off with Noiſe, the Belly falls, a then they know the Impoſtor; but the W men are ſurpriz'd very much at what is come of their Belly. The moſt comm Cauſe of this Swelling, according to *Etm ler*, is the Reception of the external Air the Womb after Delivery or a Miſcarria when the Women at that Time are too mu expoſed to the Air, without guarding Genital Parts; or when (during the Ab tion or Delivery) the cold Air introduce ſelf into the Womb, it ſwells ſo ſtrong that the Patient appears to be with Ch again. If the Suppreſſion of her *Cleanſi* happen at the ſame Time too, they cre cruel Pains throughout the *Abdomen*. T Swelling of the *Matrix* rarely happens fr any internal Cauſe.

The *Dropſy of the Womb* is an aqueous T mour, that deceives Women, and ma them believe they are with Child. We ſh diſtinguiſh the watry *Mole* of the *Mat* into that which is rare, and that which more common. That in the former, the *M trix* is puffed up by a Quantity of clear W ters, and ſometimes yellow, collected to ther in that Cavity; and that the laſt is aqueous Liquor, a little viſcous, that is cloſed in a proper Membrane, which is oft alone, and ſometimes many in Number, th are ſhown in the little Bladders (that bigger or leſs) which the Patient caſts ou from whence it is call'd the *Bladder Dropſy the Womb*. This laſt is of the Kind of *Mol* and may be defined a True Conception, a the Generation of an Egg, which is fou depraved, and the Conformation deſtroy from the nutritious Juice which is brou to it to form and nouriſh the *Fœtus*, whi Juice, after its Reception into ſome one the Membranes, is collected into ſeve diſtinct Veſicles or ſmall Bladders, that preſent this watry *Mole*, whereof we ſha ſpeak hereafter.

The Cauſes of the *Dropſy* proper to t Womb, or of the Waters collected in th Cavity, are ſeveral in Number. Sometim the *Dropſy* is joined with the *Embrio*, a cording to the Obſervations of *Hildanus* a *Salmuthius*; and the Origine of this *Drop* is the abounding of a clear, whitiſh a milky Liquor, but too watry for that Ki of Juice which ſhould be filtred in t Wo

Womb for the Nutrition of the *Fœtus*; which Liquor, being gather'd together into a large Quantity, not only is the Cauſe that the Mother cannot feel the Child ſtir; but by breaking the external Membrane in which it is contain'd, it ſometimes flows into the Birth ſome Months before Delivery, without incommoding the *Fœtus*.

If theſe Waters make their Way before the Birth, and run ſlowly, ſo that the Phyſician who is called in ſhould imagine it to be an *Abortion*, he ought to refreſh and encourage the Mother by Cordials and Analepticks, before any Thing be undertaken raſhly. Indeed the *Dropſy of the Womb* is generated by the Suppreſſion of the *Lochia*, whether whole or in part, and when the Blood flows; but there remains a ſerous Matter and a Kind of Milk which ſhould follow. This Liquor is the Occaſion of Wind riſing from the Fermentation which it makes, and the Inflation of the *Matrix* is found join'd to the *Dropſy*. Then the Courſes flow regularly, notwithſtanding the Tumour of the Womb and the *Abdomen* which remains; the Patients conceive and breed anew, and deſtroy in the laſt Birth a prodigious Quantity of *Lochia*: Sometimes the ſuppreſs'd Matter of the *Lochia* throws it ſelf upon ſome other Part, where it is collected together, according to the Obſervation of *Etmuller*. In ſhort, the Waters are collected after the ſame Manner in the *Matrix*, and ſwell, which either happens by a long Suppreſſion of the *Menſes*, or by a Return of the *Lympha* that is ſuppreſs'd, or by ſome internal Vice. Of this Kind are the *Dropſies* of the *Tubes* of the Womb and that of the *Abdomen*, which ſucceeds the Suppreſſion of the *Menſes*, where the Matter is collected in the Duplicature of the *Peritonæum*, agreeable to the Obſervation of *Tulpius*, *&c.*

The Signs of the *Dropſy* of the *Matrix* are, the Tumour that poſſeſſes the *Hypogaſtrium*, the Fluctuation when we preſs the Tumour, or when the Patient moves; the Indolence in the Preſſure of the Tumour, the Weight of the *Vulva* or the Paſſage of the *Pudenda*, the Change of the Situation of the Tumour when the Sick change Sides in Bed. This Diſeaſe is not dangerous, when the Humours that produce it are not as yet corrupted, and that in diſcharging them, ſome Excretion like that of the *Menſes* is found out; but if the Humour, by long ſtanding, comes to be corrupted, and acquires an acrid pungent Quality, the Diſeaſe is then attended with ſeveral miſchievous Symptoms, and ends in Death.

When the Women become capable of Generation, they are ſubject to a great many Alterations and Changes as well as Men; the latter of which as they come to elaborate Seed, ſo the former generate ſomething analogous thereto in their *Teſticles* and the *Womb*. When they enter into their Puberty, beſides the Hair that covers the Mount of *Venus*, the Breaſts that riſe and ſwell, they undergo a particular and proper Change, to wit, by the Evacuation of Blood through the Parts of Generation, which we call *Menſes* from their regular and periodical Monthly Courſe. We have ſaid, that this Evacuation was proper and particular to Women, becauſe there are no other Sorts of Animals that are ſubject to it. There are ſome Examples, but thoſe very few, of Men who loſe Blood regularly once a Month by the Yard, as Experience demonſtrates; and there are ſeveral who have a regular Courſe of *Hæmorrhoides* inſtead of the *Menſtrua*. The Women have their Courſes generally forſake them about 48 or 50 Years of Age; but often meet with a regular Flux of *Hæmorrhoides*, to ſupply the Suppreſſion of the *Menſes*, and ſeldom or never fail to have the *Fluor albus* in ſome Degree or other.

The *Menſes* begin at the Time of Puberty, when the Women become capable of Generation, that is to ſay, at 14 Years of Age, which is twice ſeven, and end at 48 or 49, which is ſeven times ſeven, Nature regulating her critical Motions from ſeven to ſeven. There are Women which are in their Puberty and regular at 10 and 12 Years old; but theſe Examples are rare, and do not alter the ordinary Courſe of Nature. That which *Platerus* ſays in his Obſervations is pretty ſurprizing: It is of a Woman who had her Purgations very regularly being a Maid; but when ſhe was married, they ſtop'd without any Prejudice to her Health.

The *Menſtrua* or periodical *Flux* are cauſed by an extraordinary Fermentation, produced in the Maſs of Blood by a ſpirituous *Leven* received from the *Teſticles* and the *Matrix*,

and collected in a due Quantity, which makes the Blood ſwell, diſtends the Veſſels, and makes the Circulation quicker; from whence it follows that there are Pains in the Loins with Tenſion, and a Pulſation of the Arteries in thoſe Parts and about the *Os Sacrum*, till at laſt the Blood makes its Way by the Lymphatick Veſſels, which open themſelves into the Neck of the Womb, wherein they have their Inſertion; for nothing flows by the Womb it ſelf. When the Blood is ſufficiently evacuated, the Swelling and Effervescence of the Blood ſtop, and the Veſſels contract themſelves till a new Fermentation ſucceeds.

The extraordinary Fermentation at the Time of the *Menſes* is demonſtrated by the Smell of the ordinary *Leven*, which being carried to the Noſe, advances the periodical Flux; by a Piece of *Leven*, that being taken of the Size of a ſmall Nut or Nutmeg, raiſes the Terms; by the Perception of the Fever which Women have at thoſe Times. And *Lindanus* hath obſerved a Menſtrual Fever that laſted two Days every Month. In ſhort, by every Thing that ſtops the Menſtrual Flux, which operates not but in obſtructing or retarding the Fermentation.

This periodical Evacuation, according to *Etmuller*, is injured three Ways: 1. By leſſening or an entire Suppreſſion of it; 2. By increaſing of it, when in too great Plenty; 3. By depraving it, when the Flux is not natural, and when it is attended with ſeveral Symptoms. We call it a Suppreſſion of *Menſes*, when they run too little, or not at all. It is unnatural, by reaſon of Age, as after Fifty; by reaſon of their Condition, as in Teeming Women; in ſome Nurſes, who commonly have no Purgations; in the State of Health after ſome conſiderable Sickneſs, wherein the Maſs of Blood is impoveriſhed by the Want of volatile Spirits, and incapable to receive this Fermentation. It is equally unnatural to ſuch who have ſome other Evacuation, either from Blood directly, or under the Form of a *Sanies* and Gleet from inveterate Ulcers. *Bartholin* writes, that he knew a Suppreſſion of the Terms ceaſe preſently from the ſealing up ſome Abſceſs in the Patient. We ought to leave theſe Things to Nature, and preſcribe no Sort of Phyſick to theſe Kind of Women.

That which is remarkable is, that the Sorts of Ulcers which occaſion a Suppreſſio of the *Menſes* ſuffer from great Alteration and are conſtantly worſe at thoſe Tim when the *Menſtrua* ſhould flow; which known by the Pain, Redneſs, Inflammatio and *Pus*, which runs more abundantly du ring the Days appointed for the periodic Purgations; after which, the Sympton ſtop all at once, until the Return of th next Month.

The Cauſes of the Suppreſſion of the *Me ſes* contrary to Nature are, according to E *muller*, either from the Blood, or the *M trix*; from the latter, when the Veſſels th terminate at the Neck of the Womb a ſtop'd, bound together, or vitiated and in jured, by Wounds, Ulcers, or ſome othe Reaſon; from the Blood, when its Crudity Viſcidity, or ſome other Diſorder, render it incapable of receiving its Fermentation and that Swell required in it. Among the Cauſes, as to the Non-naturals, it is too ex ceſſive Cold that ſome how or another hap pens; likewiſe cold Air taken in at th Womb during the Time of the Flux, th Immerſion of the Body in cold Water, th ſudden Coldneſs of the Feet, and that o the Stomach: Drinking cold Liquors, whic coagulate the Blood ſuddenly, ſtops the Fer mentation and Courſe of the Flux.

Raw viſcous Food, and hard Digeſtion contribute very much to this Suppreſſion; ſ hot Bread and Milk is very detrimental t young Girls at this Time, becauſe they hin der the Fermentation by their Viſcidity, an make Way for the Suppreſſion. All the *Acid* eſpecially the fix'd Minerals, as Vitriol, Sal of Nitre, and the like, put a Check to th *Menſtrua*, by thickening the Blood, and re tarding the Fermentation, which depends o volatile Principles. This Suppreſſion, an the Diſeaſe called the *Maiden* or the *Whi Fever*, commonly ſucceeds when the Di geſtion of the Stomach, being vitiated b the ill Food, preſently generates bad Chyle ſo that this *Cacochymy* is follow'd afterward by the *Cachexy*; wherefore *Barbette* had Rea ſon to ſay, that the Cauſe of the Suppreſſio was ſeated in the Stomach. It is for thi Reaſon, that all thoſe who are thus afflicted increaſe their Diſeaſe by eating of ſtrange ex traordinary and ridiculous Sorts of Things

as Tabacco, Aſhes, Pipes, Gravel, Cinders, *&c.* In ſhort, the Paſſions of the Mind bear a great Share in this Diſeaſe; for as Joy and moderate Anger increaſe the Fermentation of the Blood, and the Menſtrual Flux; ſo Terror, Sadneſs, and Fear, make dangerous Suppreſſions. We know that an Hemorrhage of the Noſe hath been ſtopped ſometimes by a Fear or Dread upon the Patient. Among the internal Cauſes, the chief is the Cachexy, and the Crudity of the Maſs of Blood, cauſed thro' a Fault in the firſt Digeſtion; for a crude Chyle not well volatilized mixing it ſelf with the Blood, renders it incapable of Fermentation.

The Suppreſſion of the *Menſes* is known by the Relation of the Sick, and the Symptoms which attend it. As to Maidens, their Blood ſtops ſuddenly here and there in their Veins, and they purge or evacuate often by extraordinary Places. The Tincture of their Skin changes, they are pale and wan, bloated, and of a livid Colour in their Cheeks. As to the married Women, they are affected with Pain at the Stomach, a depraved Appetite, Diſreliſh of Victuals, have a Nauſeating and Tendency to Puke, which ſometimes happens to Maids, but more rare, they being more ſubject to the Cachexy.

As this Inconvenience ſometimes attends Breeding Women, which is often concealed by an Excuſe of Ignorance, or by a baſe Diſſimulation in the Women, it is neceſſary, to prevent Errors in the adminiſtring Phyſick, to know how to diſtinguiſh a ſimple Suppreſſion of the Courſes from ſuch a one as proceeds from Gravitation. In the firſt Place, thoſe who are with Child are commonly of a freſh or wholeſom Complexion, and their Humours brisk and gay; but the others, who are affected with a diſeaſed or ſickly Suppreſſion, are conſtantly pale, and appear melancholy or ſad. In the next Place, the third or fourth Month, together with the Motion and Situation of the *Fœtus*, makes a Diſcovery that the Woman is with Child: To which we may add the Opening of the inward Orifice of the Womb, which is firmly cloſed in ſuch as are not really with Child. As for the Milk in the Breaſts, *Hippocrates* is of Opinion that may happen upon a Suppreſſion of the *Menſes*; but the latter ſeems rather to bear a Reſemblance to Milk, than to be really Milk it ſelf. *Etmuller* makes the following Differences betwixt the Suppreſſion of the Courſes and Breeding: 1. Thoſe who have a Suppreſſion contrary to Nature are pale, not only in the Face, but throughout the whole Body. 2. The Loathing of the Stomach in Breeding Women does not often exceed 3 or 4 Months, if it laſts longer, it comes from a Suppreſſion contrary to Nature. 3. The continual Pains of the Head ſhew the unnatural Suppreſſion. 4. The Weight and conſtant Pulſations of the Loins, and extraordinary Beatings of the Arteries or other Parts. 5. The frequent Changing of Colour, and the Alteration of Hot and Cold. 6. The painful Breathing upon the leaſt Motion of the Body. 7. The frequent, uneven, ſlow, and ſometimes almoſt loſt Pulſe, together with the Obſervation of the gradual Riſing or Swelling of the *Abdomen*, are certain Signs of Innocence.

The Suppreſſion of the *Menſtrua* is a miſchievous Diſeaſe, and cauſes a great many Inconveniencies when it laſts long, as Tumors, Abſceſs, Ulcers, Inflammations, Loſs of Complexion, Fevers, Cachexia's, Dropſies, Loſs of Appetite, Vomiting of Blood, Lipothimia, Phthiſicks, Pains in the Head, Melancholy, Madneſs, and ſometimes the Gout; and according as theſe Accidents are more or leſs in Number or Violence, the Malady is more or leſs dangerous; ſo that ſometimes it procures Death after a tedious and painful Sickneſs.

An *immoderate Flux* of the *Menſes* is a Diſeaſe oppoſite to the *Suppreſſion*, in which the Menſtrual Blood flows too plentifully. In the natural Flux, thoſe who are young, and eat and drink high, have abundantly more of their Courſes, and they laſt longer, than others who live more ſparingly. Likewiſe we ought to diſtinguiſh this from the Weakneſs of the Force that occaſions it, not from the Quantity of Blood. The Cauſe, agreeable to *Etmuller*, proceeds from the Blood that flows from the Veſſels of the *Matrix* that contain it. It comes from the Blood: 1. When the Fermentation is too ſtrong, that it ſwells exceſſively, and is conſequently thrown in greater Quantities through the Veſſels of the *Matrix*. Of this Kind is the violent Deſire of enjoying the Man, that ordinarily produces in young Girls, and thoſe

who have not been poſſeſs'd, exceſſive Floodings. 2. When the Blood is aqueous, too thin, and fluid: This is the Reaſon why fat, groſs Women, full of ſerous Humours, are ſubject to this Diſeaſe, and the Blood which they are uſed to caſt out is ſerous, watry, and like the Waſhings of Fleſh. This is what particularly happens to ſuch who have a bad Digeſtion, that uſe different Sorts of Liquors, and regard no Kind of *Regimen* or Method of living.

The Cauſe of an exceſſive Flux proceeds from the Veſſels of the Womb, when they are opened by *Anaſtomoſes*, or by ſome external Violence; when they are corroded by ſome acrid Remedies applied; that they are too much diſtended by a Miſcarriage, or a difficult Labour, or ſome other extraordinary Motion of the Body, that may excite too large an *Hæmorrhage*. This immoderate Flux is known by the Weakneſs of the Patient: But when the Flux is extraordinary much without Loſs of Strength, it is a Sign that Nature diſcharges or eaſes it ſelf this Way, and that it is critical; but when we ſee a Woman weaken'd by it, we may ſay it is immoderate.

The Cauſes of this Flux are known by the following Signs: When there is a Heat and Ebullition of Blood, it is from theſe Inflammations and Ebullitions, the Eyes look red, the Veins are tumid, the Pulſe large, ſwift and quick. When there is too great a Fluidity of Blood, the Nature of that is ſhewn; for the Blood is thin, and leſs proper to coagulate. If that the *Vulva* is too narrow or contracted, the Linen which receives the Flux is ſcarce ſtained, and but little Red upon it. As for the Acrimony of the Blood, that appears by the corroſive biting Pain that is upon the Parts of Generation. If the Flux laſts long, the Paleneſs or rather Wanneſs of the Face, Loſs of Appetite and Strength, the *Sincope* or Fainting, Whites, Atrophy or Waſting, and a *Cachexia*, ſucceeds. The more obſtinate this is, the more difficult it is to cure, and that not at all in Age, where it generally terminates with Life. When the Patient is cacochimick, and the Bile and Pancreatick Juice vitiated, they diffuſe themſelves more plentifully into the Inteſtines during the Fermentation, as it commonly happens, and there they generate abundance of Wind in the E ferveſcence: Afterwards the Acid remainin Maſter, is carried into the Meſentery, whe it raiſes Convulſions and other terrible wan dering Pains, that laſt till the Blood is void ed, and the menſtrual Fermentation at a End; when theſe grievous Symptoms ceaſe and all is calm.

The Difficulty of the Courſes is know by the Relation of the Patient. It termi nates ſometimes in a total Suppreſſion, an thoſe who are ſubject to it are uſed to fa into a Suffocation of the Womb. The to little Quantity of Menſtrual Blood is almo from the ſame Cauſe with that of the Sup preſſion, and we may principally accuſe th too great Viſcidity or *Lentor* of the Blood which cannot produce a good Menſtrua Fermentation.

The *Menſtrual Flux Drop by Drop*, fro its Affinity with the immoderate periodica One, does not differ, but as to more or leſ In this the Blood flows continually, or i flows a long Time at each Period, not ſ readily as it is natural, but ſucceſſively, an by Drops. The Reaſon, ſays *Etmuller*, i the Acrimony of the Blood, joined with th *Lentor*; and moſt commonly it is the Con traction or Straitning of the Veſſels whic is found join'd to a continual Irritation, tha forces the Blood to iſſue out Drop by Drop Likewiſe *Foreſtus* has obſerved a laſting Flu of this Nature, that degenerated into a Ulcer of the Womb in a cachectick Woman In the Caſe where the Menſtrual Blood is o an ill Colour, there flows with the Bloo a viſcid whitiſh Mucous. The Menſtrua Blood has naturally no Smell, but upo reſting on the Part, or Stagnation, it wi ſometimes contract a fætid Odour, which always bad and diſagreeable to the Patient.

An irregular Menſtrual Flux is, whe the Courſes obſerve no ſtated Time, bu come ſooner or later, without any Regar to a fixed Period. This is an Effect o the Texture of the vitiated Blood, which in terrupts and hinders the Menſtrual Fermen tation, which recovers it ſelf at one Time, an loſes its Force at another. This Miſchi ends at laſt in a total Suppreſſion of th *Menſes*, or a *Leucophlegmatia*. It happe ſometimes that the *Menſtrua* flow by Pa through which they ought not; at o

Time by the Gums, at other Times by the Navel, the Lips of the *Vulva*, the Corners of the Eyes, and ſometimes by the Toes. Upon ſome certain Occaſions, the *Menſes* flow by the Mouth, in Vomiting or Spitting, and they have been known to iſſue out at a Wound. The Cauſe of this extraordinary Eruption is lodged in the Hypogaſtrick Veſſels, which terminate at the Neck of the Womb; for the Blood flows not at all by the *Matrix* before the Birth, and therefore theſe Veſſels are either naturally ill made, or too ſtrait, or elſe obſtructed by ſome Accident.

We call the *Uterine Flux*, or *Whites*, that by which there comes through the natural Parts a pituitous Humour, either thick and mucilaginous, or watry and ſerous, being ſometimes acrid, ſaline and piquant, ſometimes benign and ſweet. It is ordinarily White, now and then Yellow, Green, or of ſome other Colour. It has no Smell, and very rarely ſtinks; when it does, it is when there is an Ulcer, from whence proceeds *Pus* that mixes with the *Whites*. It is obſervable, that Women and Maids of all Ages are ſubject to this Infirmity, and the Difference of the Colour of them happens equally to thoſe that have, and thoſe that have not their *Menſes*. Old Women, when paſt their Courſes, are ſubject to this Flux. Very young Girls are rarely afflicted, but Breeding Women are ſeldom free from it. This Indiſpoſition hath no Regard to a periodical Courſe; ſometimes indeed it is with it, and ſometimes in the Intervals: The Flux notwithſtanding is more in the Monthly Courſes. This Flux, as *Etmuller* ſays, called the *Whites*, is that Liquor which exſudes or iſſues out from the Glands of the internal Orifice of the Womb; to wit, that ſeminal rarefied Matter which the Women emit or diſcharge in Coition, or ſome other ſerous Humour which is filtred by the Glands, and throws it ſelf off from the Maſs of Blood. The firſt Liquor makes the true Matter for the real *Gonorrhea* in Women, which is like that of Men. The ſecond Sort makes the Matter for the falſe *Gonorrhea*, or the *Whites*, in Women. There is a Difference to be made in theſe two Whites, continues he. There is a ſlight Sort, where a little *Lympha* flows that is ſcarcely turned whitiſh, but is a little viſcous, without any conſiderable Inconvenience to the Body. This is then that true *Gonorrhea* in which the internal Orifice of the Womb is only affected. Sometimes theſe *Flowers* are plentiful, conſtant, loaded with *Serum* of divers Colours, and run abundantly. The *Cachexia* or *Leucophlegmatia* throughout the Body is found join'd together with the Swelling of the Feet, a Lazineſs and Numbneſs of the Hands and Legs, and other the like Symptoms. That which is the falſe *Gonorrhea* proceeds from a *Cachexia* or ill Habit of the whole Body. *Heurnius* diſtinguiſhes exactly theſe two Sorts of *Whites*. He calls the firſt *Uterine*, ſince they ariſe ſolely from the Vice of the *Matrix*. He calls the laſt Sort Womens Flowers, as proceeding from the whole Body.

The Cauſes of the true *Gonorrhea* in Women, are from the too great Abundance of this ſeminal Matter, or too large a Supply of Spirits, which tumefies the Parts, joined to ſome Relaxation of the internal Orifice of the Womb, that lets this Matter eſcape: Or they ariſe from too much Intermiſſion of accuſtomed Coition, and the paſſionate Deſire of enjoying the Man; particularly if they are fed too high, if their Lives are too ſedentary, and they are free from Care and Paſſion. The Cauſe of the *Gonorrhea* is the Relaxation and Flabbineſs of the internal glandulous Orifice of the *Matrix*, the Contexture of theſe Glands being ſo much relaxed, that they let ſlip through them, like an univerſal Strainer, the Mucoſity of the crude Chyle that is infuſed in a great deal of acrid *Serum*, and the Crudities of the Maſs of Blood, which comes from the Defect of the Stomach. This Liquor being conſtantly filtred by the relaxed Orifice, and the Glands, which are without any Contraction or Spring, the *Nymphæ*, which are naturally dry, now emit a Liquor. This is what makes the Patients ſo ſubject to the *Cachexia*, or rather to a compleat *Leucophlegmatia*, or ſwell'd Feet, without having any Deſire to the Venereal Act, Symptoms which appear evident. The Cauſe which determines theſe Superfluities of the Blood to flow from this Part, is the Relaxation, and a Kind of *Paralyſis* of the internal Orifice of the Womb, and enters the remote Cauſes of difficult Labour, and the Abortion, which

are

are ſuch common Cauſes of that Flux which follows the too great Diſtention, the Tearing, or ſome other Wound, of the internal Orifice of the Womb.

The *Whites* are known by the Report of the Patient, and may be diſtinguiſhed before any Thing elſe, if it is a true *Gonorrhea* or a falſe one. In the firſt, the Flux is moderate, but ſmall in Quantity, without Acrimony, and will continue a long Time without any conſiderable Inconvenience. In the falſe *Gonorrhœa*, the Flux is large or acrid, of an ill Colour, with a Cachexy, Loſs of Strength, and Numbneſs throughout the Body. If the *Lympha* is found to be too acrid, there will appear Nocturnal Fevers, with the Catarrh, or colliquative Sweats. This Flux uſually makes Women barren, augments the Cachexy, produces the Dropſy, Falling down of the Womb, Exulceration of the *Vagina*, and at laſt Death.

The *Chloroſis* or Paleneſs of Complexion is nothing but a Change of the natural Colour of the Body into a pale yellowiſh Colour, attended with a languid Deadneſs throughout the whole Skin, a Loathing or Diſguſt of Proviſions, a Palpitation of the Heart, Difficulty of Breathing, a melancholy or diſmal Aſpect, and *Oedematous* Tumors on the Legs. This Diſeaſe, according to *Lindanus*, conſiſts in a Suppreſſion of the ſeminal Fluid, which is changed and broke, and ſo altered, that it putrifies or corrupts the whole Maſs of Humours.

The Knowledge of this Diſeaſe and its Cauſe is difficult, and requires the Skill of an able Phyſician; for it is not without great Danger, becauſe it perverts the whole Oeconomy of the Body. The Heart is always ſtrongly affected, and we ſee 'em die ſometimes very ſuddenly of a *Syncope*. The Action of the Liver is commonly much altered, and the Stomach appears always in Diſorder, in Loathing, and frequently in a Loſs of Appetite called *Malacia*. In fine, the *Matrix* receives a great deal of Damage, and may render the Patient barren, if the Diſorder is great, and it laſt any Time.

The *Cachexia* in Women, according to *Etmuller*, is the ſame with that in Men; with this Difference, that the former is always attended with a Suppreſſion of the Courſes, which uſually paſſes for the Cauſe it ſelf: That few or none know its real Effects, ſo the cachectick and cacochymick Diſpoſitio of the Blood, that degenerates from its natu ral Conſtitution, which is *Salino-volatile* and this is the true Cauſe that ſtops or check the Menſtrual Fermentation of the Blood and the Evacuation that follows. *Reneaume* obſerves practically, that in the Cachexy o Women, the *Menſes* are uſually ſuppreſs' by abundance of Crudities that deſtro Sanguification, and produce a thouſan Symptoms. We ought to correct the Ca chexy according to the common Practice, b Emeticks and Alteratives, and firſt of all b Steels; afterwards Aromaticks, adding i the End ſome acuating Medicines to provok the Terms, and they will flow readily as be fore. It is nevertheleſs certain that the Sup preſſion of the *Menſes*, from what Cauſ ſoever, is the Source of a thouſand Miſchief eſpecially if the *Menſes*, when actually flow ing, come to be ſuddenly ſuppreſs'd by Fea or ſome other Cauſe. Pleureſies, Quinſie Inflammations of the Womb, Epilepſies, an the like, are not half ſo dangerous; for a the periodical Time the Blood ſwells, with out being able to make an Eruption by th uſual Places. We ſee then it makes Havoc every where, the *Pica*, Hiſterick Fits, terri ble Epilepſies, Convulſion, Hypochondriac Melancholy, Scyrrhus, Tumours of the *Vi cera*, eſpecially thoſe of the Spleen, are th Conſequence. From hence come cruel an obſtinate Headachs, frequent Palpitations o the Heart and other Parts of the Body, eſpe cially from the Spine, Loins, or *Hypochondri* In ſhort, the Leven or Ferment of the Sto mach is deſtroyed, the Balſam of the Bile dead or loſt, and the precipitating Virtue the Pancreatick Juice degenerated, whic makes Way for ſeveral Sorts of *Cachexia* Jaundice, *Leucophlegmatia*, Dropſy, and a infinite Number of Evils, which ſucceed th Suppreſſion of the *Menſes*.

The *Hiſterick Fit* or *Paſſion*, called by ſom the *Mother*, and others the *Suffocation of th Womb*, from one of the moſt preſſing Symp toms, to wit, the Contraction or Narrow neſs of the Breaſt, and the Difficulty of Re ſpiration, which is ſometimes ſo great, th the Patients ſeem to be choaked or ſtifle and remain ſo for ſome Time, without Sen or Motion. In the Approach, or at the B

ginnin

ginning of the Fit, ſays *Etmuller*, the Pa-
ients perceive a Grumbling in the Stomach
nd Belly, and in thoſe Parts a Kind of Ball
hat heaves it ſelf up from below. The
enſion of the *Hypochondria*, the Noiſe,
Wind and Belchings, ſucceed. Theſe Belch-
gs are attended with frequent Yawnings,
retching of the Arms, and other the like
ymptoms. They feel the Pains in the Bel-
, ſometimes as if torn in Pieces, ſometimes
ith Diſtenſion, ſometimes with Contortion,
ither fixed or wandering. The Appetite is
rdinarily abated, and all they eat is of an
l Taſte. Their Belly is conſtiped or bound,
nd they receive great Relief when relaxed
om that State by Clyſters, particularly it
roceeding from Wind. Some vomit green
atter, and have terrible Contractions of the
reaſt. The Heart beats and trembles, the
ulſe is rare, feeble, ſmall, and intermiting;
e *Syncope* ſucceeds, the Senſe is loſt, the
reathing laborious, uneven and embaraſs'd;
d when the Fit is violent, they appear
ead to our Senſes. The Patients feel a
ontraction at the Throat, like as if ſtrangled
ith a Cord. The *Vertigo* and the Dimneſs
the Eyes gives us Notice that the Paroxiſm
Fit is coming, when the Diſeaſe is habi-
al. During the Fit, the Eyes roul, they
rn themſelves back, and are hid from the
ght. Sometimes the Fit ends by a ſudden,
rcible, and involuntary Laughter, which
ts ſome Time, and they rave and talk
ld. When the Fits are ſtrong, the Con-
lſions of the Members, and the Epileptick
otions, follow: The Diſeaſe then changes
Name, and is called an *Uterine Epilepſy*.
e Agitation of the Members, and of the
ole Body, the Loſs of all Senſe, as well
ernal as external; but we ſometimes meet
th Caſes where the Senſe remains free, and
Patients only loſe their Words in the
, but afterwards recollect, and will re-
all that has paſſed. The Epileptick Con-
lſions are rare, the Symptoms of the Breaſt
the *Abdomen* are more common in the
emence or utmoſt of the Acceſs, the Pa-
ts are ſometimes cold, ſometimes hot, and
r Heat laſts a great while after. Theſe
ptoms indifferently attack all Sorts of
s, as well young Girls as Women:
metimes young People before they are at
to have their Terms, and old Women
after they have loſt them. All theſe Symptoms are not to be met with in every Patient, nor the ſame in any one, for ſome are leſs afflicted and ſome more, and with more or leſs Violence. The Pains and Troubles of the Belly ordinarily begin in the *Abdomen*; theInquietudes of the Breaſt, and the Difficulty of Breathing, ſucceed.

The Hiſterick Suffocation differs from the *Sincope*, in that it is not preceded by the ſame Accidents that we have ſaid of the other; that it is attended with a cold Sweat, a greater Paleneſs of the Face, and a ſenſible Ceſſation of the Pulſe; and that in the End it much ſpeedier terminates in Death than a Cure. But on the other Hand, Hiſterick Women ſometimes remain two Days in a Fit, and come to themſelves again, which ought to be a Caution leſt ſuch be buried alive, that they be kept ſome Days before Interment.

We diſtinguiſh this Diſeaſe from the *Apoplexy*, in that it happens not ſo ſuddenly, nor is attended with ſo great a Reſolution of Parts, or Privation of Senſe, nor with a Snoring in Breathing. We diſtinguiſh it from the *Epilepſy*, in that we do not ſee any Spume or Frothing at the Mouth, no convulſive Motions, as in the *Epilepſy*; beſides in this the Pulſe appears ſtronger than ordinary, inſtead whereof, in the Hiſterick Fits, it is extreamly feeble. We obſerve, that Hiſterick Women appear ſometimes as if they were dead, when the Paroxiſm is violent; and that the Things that ſerve to dinguiſh whether they are really dead or no, are a Looking-Glaſs and Feathers; that ſtrong ſneezing Powders are very efficacious, ſf ſnuffed up the Noſe; but if neither that nor ſtrong Vomits or Bliſters have any Effect, they are Signs of Death.

The Cauſes of the Suffocation are either remote or proximate. Among the remote Cauſes are, the grand Paſſions of the Soul, eſpecially Anger; and *Etmuller* ſays, he has ſeen Women who have fallen into theſe Fits as often as they have been provoked. The proximate or immediate Cauſe of this Diſeaſe conſiſts in the vitiated Effervescence of the Pancreatick Juice with the Biliary in the Inteſtines, from whence ariſes Wind as well as Belchings. This depraved Juice is thrown into the Veſſels, where it coagulates, and

ſtag-

nates the Blood. The Motion being depraved and irregular from the Animal Spirits, mixes at the ſame Time in the Part, firſt of all in the Intercoſtal Nerves and *Par Vagum*, and conſequently in the reſt. From hence comes *Vertigo's*, *Deliria*, and Convulſions of the membranous Parts of the *Abdomen*, Inteſtines, Meſentery, *&c.* of the membranous Parts of the Breaſt, and the ſame of the Heart: That which makes the Palpitation, is a Senſe of the Compreſſion in the Heart continued by the Syſtole. This Diſorder, tho' it is not commonly mortal, yet it is not without Danger, and gives a great deal of Terror. Hiſterick Fits are of very ill Conſequence in Women with Child, and in Child-bearing, becauſe in the laſt there is Dread of ſuppreſſing the *Lochia* or Cleanſings, and encreaſing of Weakneſs.

The *Furor Uterinus*, or Madneſs of the Womb, is an exceſſive Deſire of Coition, which carries the Woman to Diſtraction. They throw away all Modeſty to talk lewdly, and they commit a thouſand Extravagancies. The Cauſe is, the abounding, as well as Acrimony, of the ſeminal Liquor that iſſues from the internal Orifice of the Womb, which, by its continual Irritation, acts powerfully upon the Animal Spirits in the Brain, giving Occaſion to the Soul to form Idea's of amorous Pleaſure, and to excite at laſt ſuch a Diſorder, that makes a Kind of *Delirium* only in regard to Venereal Actions. Young Girls in Love, and young Women who marry impotent Men, are chiefly ſubject to this Indiſpoſition, eſpecially if they are ſanguine, and live delicately; and the other Non-naturals contribute conſiderably to the Generation of this Fluid. This Diſeaſe is very reproachful, but not difficult to cure, provided Remedies be applied at the Beginning; otherwiſe, if it be neglected, it may eaſily degenerate into a perfect Madneſs.

Barrenneſs proceeds either from the Huſband in the Generation and Ejection of the *Semen*, or from the Woman in the Formation and Diſpoſition of the *Ovaries*, or from the Womb, or the Neck of the Womb; from whence it happens that Women commonly are made barren after a falſe Conception, or a difficult Labour. The Vice may perhaps proceed from both the Woman and the M reſpectively; ſo ſuch a Man may not h Children by ſuch a Woman, and yet h Children by another; and ſo of the Wom reciprocally. All Authors Ancient and M dern agree, that there ought to be a cert Proportion and Harmony of Parts betw the Man and the Woman to produce C ception; but no Body has yet explained w that is, or wherein it conſiſteth. Moſt P ſicians agree, that the Cauſe of Barren is more frequent in the Woman than Man; for if in the latter, it will app evident and plain to the naked Eye, it ing ſeated either in the ill Formation of Yard, or in the Badneſs of the Seed, b which are viſible: But a Woman may barren, and no Cauſe can be poſitively ſign'd for it, there being ſo many Parts t may be defective in her which are intern and conſequently hid from our Eyes.

Among the internal ſecret Cauſes of B renneſs in Women, we uſually blame Temperature and Diſpoſition of the Bod but undoubtedly the Formation of the Pa is the moſt common Impediment: Beſi which, there may be a Fault in the *Ova* not receiving the ſpirituous Parts of the *men*, to impregnate them; or in the *Tub* after they are impregnated, not convey them into the *Matrix*; or otherwiſe, in Conſtitution of the Body of the Wom in not affording due Aliment to the *Fe* after Conception; for Women that are hecti dry and lean, together with thoſe who extravagantly fat, are leſs fruitful than othe and ſometimes totally barren. In ſhort, *ſues* that run plentifully, *Ulcers*, and inve rate *Fiſtula's*, that waſte and conſume Maſs of Fluids, are general Cauſes of Barr neſs. Where the Membrane of the *Mat* is too lax, and the internal Orifice of Womb too open, it ſubjects the Perſon Barrenneſs, as appears in cachectick Wom and in thoſe who have immoderate *Wh* and *Hemorrhages*, which Sort of Conſti tions the Ancients uſed to call a cold a moiſt Temperature of the Womb, where Parts were under a Sort of Inundation pituitous Moiſture: Beſides a conſtant Cou of *Whites* will procure a particular *Bar neſs*.

We know that a Conception is made, if after Coition or Enjoyment the *Semen* does not fall out of the *Vagina*, but is retained and ſucked up into the *Matrix*; if the Woman feels a little Chilline ſs, with a Kind of Itching in the Womb, which contracts it ſelf; if the internal Orifice be firmly ſhut, and the Natural Purgations ceaſe. However we ought to take Care not to reckon upon that Score alone, for ſometimes they will make a Show the Month following, and ſometimes two or three Months after in *Plethorick* Conſtitutions. The Purgations being ſuppreſs'd, there grows together a Maſs of Humours, which occaſion various Symptoms in the firſt Months of Gravitation, as Shiverings which come by Intervals, Loathing of Victuals, Nauſeating after Eating, Vomiting, and Longing to eat or drink whatever their Fancy ſuggeſts to them. And theſe Accidents laſt generally till the *Fœtus* grows pretty large, conſuming a good Quantity of Blood for its Nouriſhment and Increaſe; and that Nature has driven the Superfluity into the Capacity of the Womb, and among the Tunicles or Coats of the *Fœtus*, to be thrown out therewith in the Birth.

The *Fœtus* in growing makes the Belly ſwell, but ſtill in a different Manner from that of other Tumors againſt Nature; that Women who have but once taken Notice of it can eaſily diſtinguiſh; for it raiſes it ſelf directly towards the Navel, and the Woman in about 4 Months after feels the Motion of the Infant; and to diſtinguiſh it from a Collection of Water or Wind, it ſtill keeps hard to the Navel, and does not fluctuate under the Hand: Beſides, the Nipples of the Breaſt turn livid, and after Quickening the Breaſts ſpring with Milk.

The *Mole* is nothing but a Maſs generated by Conception in the *Matrix* inſtead of a *Fœtus*, and appears like a Lump of ſolid Fleſh. *Claudius Courvee* thinks, that there is no Difference betwixt a true living *Fœtus* and a *Mole* in regard to the Conception, for the ſame that produces a perfect *Fœtus*, being depraved, produces the *Mole*; for it happens equally that a natural and true Conception degenerates at laſt into a Mole in the Time of Formation in the Womb. To underſtand this the better, the *Fœtus* is incloſed betwixt two Membranes called the *Amnios* and the *Chorion*. The *Amnios* is a thin Membrane, which is as a Wrapper, in which the *Fœtus* is formed and kept, and which hinders the albuginous Humour from mixing too plentifully with the gelatinous, that it may not interrupt the Formation: When then the Membrane of the *Amnios* is hurt, and that there is Permiſſion given for the two Liquors to mix together confuſedly, the Work of Formation is diſturbed, and inſtead of a perfect *Fœtus*, there is generated a Maſs of unform'd Fleſh, in which Deformity are certain Marks of the wild Imagination impreſs'd upon it by the Mother. The remote Cauſes of the Generation of the *Mole* are ſometimes in the Mother, that hinder the Formation of the *Fœtus* by a fearful Motion, by a Stroke on the Belly, by ſudden Anger, or other outragious Paſſions, in breaking the Membrane of the *Amnios*, and giving Occaſion to the Confuſion of Humours.

The Motion perceived towards the fourth Month of the Conception makes us perceive that it is a *Mole*; for when the Mother turns her ſelf from one Side to the other, there is a heavy Maſs that follows the ſame Motion; whereas in a true Pregnancy, the *Fœtus* loſes nothing in the Womb, but maintains the ſame Situation, let the Mother turn on which Side ſhe will. The Senſe of the Weight is much greater when the Womb bears a *Mole* than when it carries a true *Fœtus*, for then the Weight preſſes upon the *Vulva*, which does not happen in the *Fœtus*, which remains in the Belly without incommoding it, and does not fall down till the Time of Birth draws on. In the *Mole*, the Belly does not mount forward, as in the *Fœtus*; but it ſwells equally on both Sides and before, and particularly in the *Hypogaſtrium*. The Women perceive Pains, with Pricking in the Womb, which, according to ſome Authors, are particular Signs to diſtinguiſh a *Fleſh Mole* from a real Conception. The more the Symptoms uſed to diminiſh in the true Gravitation about the Middle of the Term, the more they increaſe and grow double in the *Mole*, which makes thoſe who labour under it extreamly pale and without Colour. The Women that are with Child are uſed to have Milk in their Breaſts about the 4th or 5th Month, which does not hap-

ſen to thoſe who have *Moles:* Their Breaſts ſwell indeed, but it is with a Matter that is rather ſerous and watry than milky. In the *Fœtus*, the Menſtrual Purgation ſtops entirely; in the *Mole* it is quite the Reverſe, for every two or three Months it flows, and the Blood is more plentiful, and of an ill Colour. Women with Child never feel any Pain at the Times of Expectation of their Monthly Courſes, or any Tenſions, but only a brisker Motion of the *Fœtus*. The contrary happens in the *Mole*. Theſe Signs are much plainer when the *Mole* is ſingle, than when join'd to a living *Fœtus*, only then the Tumour of the Belly is larger, and the Motion from one Side to the other. The *Mole* is a Caſe that is always dangerous; for if it is join'd with the *Fœtus*, or it deſtroys it, or elſe is born with it, it renders the Labour tedious; if it is ſingle, and if it breaks before Delivery, it infects the Womb; if it is not corrupted, but remains entire, it will ſtay two, three, and ſometimes ten Years in the Womb, and poſſibly may continue during the Mother's Life. In ſhort, if it comes away of it ſelf, which is rare, or by the Help of Medicines, it occaſions great Pains, and eſpecially vaſt *Hæmorrhagies* from the Womb.

Abortion is an Expulſion of the *Fœtus* out of the Womb, contrary to Nature, betwixt the Term of its Formation and the uſual Time of its Birth, that is to ſay, from the ſeventh Day to the Beginning of the ſeventh Month; for before the ſeventh Day it is not properly an Abortion, and after the ſeventh Month it may be a Birth for Life. The immediate Cauſe of *Abortion* is ſeated in the Womb; ſo that its Irritation and Contraction (if unnatural) force it to expel the *Fœtus*, or that ſome extraordinary Relaxation hinder Nature from retaining it to its juſt Time; for as the Womb is membranous and fibrous, it is from the natural Contraction of theſe Fibres that the Retention of the *Fœtus* depends. It muſt be then this Spring, which is injured by too great a Contraction or Relaxation of the Fibres and Membranes, that hurts the due Retention of the *Fœtus*; and it is puſh'd out before the Time, or not being able to keep its Hold, it falls out. Among the remote Cauſes, there are chiefly three, to wit, the Commotion of the Soul, Violence, or the too great Motion of the Body; and ſhort, the Fault of the Mother, which d not ſupply the *Fœtus* with proper Nouri ment.

The *Matrix* is irritated and excited to pel the *Fœtus*, by Means of it ſelf be weak, ſick or dying; becauſe the Wom being injured by the Stench or Action of *Fœtus*, contracts it ſelf forcibly, and ma the Expulſion. The great Paſſions of Mind, which violently agitate the Maſs Blood, and put the Spirits in great Diſord are uſed to procure Abortion; ſuch are th of exceſſive Joy, Anger, *&c.* Food that too nutritious, and Drink too ſpirituo ſometimes cauſe Abortion. The Irritatio and Diſorders of the adjacent Parts, wh have Communication with the Womb, co tribute alſo to Abortion; as the *Dyſente* that irritates the Inteſtines; the *Teneſm* acrid Clyſters or Suppoſitories imprudent applied, which move forcibly downward ſo Nephritick Women are very apt to Abortive.

Gripes from the Colick cauſed by the U of Autumnal Fruits that are eaſy of Ferme tation, and Gripes join'd with Hyſterick Fi provoke Abortion for the ſame Reaſon. T *Matrix* of an ill Conformation, either t ſtrait, ſubject to ſome Tumour, or *Scirrh* or ſome ſecret Ulcer, irritates it ſelf, and i ſtead of ſtretching to make Room for t *Fœtus*, it throws it out. Too great Moti and immoderate Exerciſe of the Body is ve inconvenient and prejudicial, eſpecially the Middle of their Time of Reckonin Sneezing, Coughing and Vomiting, have t ſame Effect, if they are violent.

The remote Cauſes of the Relaxation which hinder the Womb from retaining t *Fœtus*, are the *Whites* before or after Conce tion; and the ſerous *Cachexy*, which rend the Fibres and Membranes of the *Matrix* t looſe and ſlack, ſo that the internal Orif is always kept open, which prevents the R tention of the *Fœtus*. The Fault or Depr vity of the Blood and Spirits is of this Kin for the Womb wanting Blood and Spiri loſes its Tenſion and natural Spring, and lets fall the *Fœtus*; which is the Reaſon wh great *Hæmorrhagies*, raſh Bleedings, and thoſe Things which ruin the Blood and Sp rits, diſpoſe the Parts for Abortion. Fe

nd ſudden Frights ſometimes kill the *Fœtus*, nd ſo relaxes the Womb, that it drops the urthen, as a Fright makes us throw out our Hands what before we held faſt, which perience ſhews. The ſame Thing happens the Womb; and it is for the ſame Reaſon at *Syncope's*, *Lipothimia's*, Fear, and laſting rief, are uſed to procure *Abortion*. In ſhort, *Opium* cauſe *Abortion*, it is by fixing the pirits and hindering their Action, by which eans the Membranes and Fibres of the Womb grow lax.

We may foretel *Abortion* by the following gns: 1. By the unuſual Weight of the Reion of the Loins downwards: 2. By the anding Pains which carry themſelves to e very Neck of the Womb: 3. By the ruption of aqueous Blood, like that hapens in the Birth: 4. By the Tumour or elling, which being firſt carried up to the avelwards, deſcends towards the *Os Pubis*: By the Tremblings, Shiverings, and ſudn Heats, which ſucceed one another, and hich are added to Pains of the *Abdomen*. he Signs of *Abortion* are taken from the reaſts, *viz.* from their being dried up and agging, or from the Milk or Blood that rops from them, which denotes the Corruption and Decay of the Aliment of the *Fœtus* in the Womb, which is the ſame Matter as that which ſwells the Breaſts and compoſes the Milk. Now if that Matter is vitiated, ſo that it fails entirely, or that it is kept from the Breaſts, it betokens the Deſcent of the *Fœtus*, and conſequently the *Abortion*.

An *Abortion* is always more dangerous than a Delivery, becauſe that it makes a violent Rupture of the Veſſels and Ligaments which tie the *Fœtus* faſt to the Womb; from whence follow great *Hæmorrhagies*, *Fevers*, *Syncopes*, *Deliriums*, *Convulſions*, *Inflammations*, and *Gangrenes* of the *Womb*. Amongſt theſe *Abortions*, that of the firſt Child is always moſt dangerous, becauſe that the Parts of Generation are as yet ſtraiter, and extremely ſenſible. The Danger is ſtill greater in the *Abortion*, as the *Fœtus* is large, and the Mother weak. A violent *Abortion* is ſucceeded ſometimes with Barrenneſs, by wounding the *Matrix* and *Vagina*, eſpecially in a Miſcarriage from the firſt Conception; after which, it happens that the Woman remains barren, or that ſhe is not with Child again for ſome Time.

Of the Delivery *of* Women. *From Mr.* Dionis.

THE Delivery of Women is commonly performed by Matrons, to whom we give the Name of Midwives. 'Tis evertheleſs comprehended under the Numer of Chirurgical Operations; and no Man, hat is a Chirurgeon, can pretend to underand his Art, without being acquainted ith all that relates to the Art of Midwifry: ut my Deſign is not to treat of this Subct in its whole Extent, but only to hint at me Things in the moſt preſſing Occaſions. hen a Surgeon is called to a Woman who bours under a continual Loſs of Blood, muſt examine the Cauſe: If ſhe is ſeiz'd ith intermitting Pains, and Clots of Blood ue forth, 'tis certain there is a falſe Conption; for if it were only the Woman's Terms detained, the Blood would run out of the Veſſels. The Surgeon muſt inform himſelf how long the Woman has been pregnant, in order to judge of the Bulk of the falſe Conception; as alſo, whether ſhe before had any Children; for if it be her firſt Pregnancy, ſhe will ſuffer much and a long Time, by reaſon that the *Matrix* not being yet open'd, ſhe muſt undergo the more Pain to give Iſſue to the Body that it contains, which being ſoft, is not capable of forcing a great Extenſion. Tho' the Pains and Clots of Blood diſcover to the Surgeon that there is a falſe Conception, he is yet more aſſured of it by the Touch: He finds the internal Orifice of the *Matrix* a little open, and introducing his Forefinger, he feels the exotick

Body, which he muſt draw out as ſoon as poſſible. Having then ſlid in one Finger, he turns it in the Orifice, in order to dilate it more than it already is, and to get in another, and then a third, if he can without Violence, with which he takes hold of the falſe Conception, in order to draw it out by ſlow Degrees. If he cannot get hold of it at firſt, after having turn'd his Finger around, to looſen it from the *Matrix*, he leaves the Woman to repoſe a little, in order to ſee whether the *Hæmorrhage* continues; for frequently it ceaſes when the *Embrio* has no more Life remaining, that is, when 'tis wholly diſengaged from all the Veſſels of the *Matrix*; and then we expect it to come out of it ſelf, or that it ſhould be driven out by the leaſt Effort of the Woman, as when ſhe offers to go to Stool. But if the Flux of Blood continues to Exceſs, the Woman may die before the falſe Conception come out: In order then to deliver her, we uſe the *Dilator* to open the internal Orifice, and where the Fingers cannot do, the *Crane Bill Forceps.*

The Woman is no ſooner deliver'd, than ſhe muſt be freed from a Maſs of Fleſh called the *After-birth* or *Placenta*, and that before the Ligature be made on the Navel; but Care muſt be taken to ſecure the Child, by expeditiouſly laying it on that Side. The Surgeon, in holding the Navel-ſtring, muſt partly wrap it round two Fingers of his left Hand, and taking it with his right as near the After-birth as he can, he muſt gently draw out the *Placenta*, and by eaſy Motions looſen it, in order to diſengage it, if it is not before wholly freed from the Womb. If we oblige the Woman to hold her Hand ſhut, make her cough or ſneeze, provoke her to vomit, or the like, they will aſſiſt the iſſuing out of the After-birth, which muſt not be drawn out too roughly; but if it break, Care muſt be taken immediately to fetch it out by Hand; and if it ſticks to the Womb, it muſt be dextrouſly ſeparated by gliding the Hand betwixt the After-birth and the internal Surface of the Womb; if it is not eaſily removed, 'tis better to let ſome remain to be cleanſed away with the *Lochia*, than to tear the *Matrix* too much.

A *Mole* is a fleſhy Subſtance much harder than the After-birth. It fills the Bottom of the *Matrix*, to which it adheres by ſev ſmall Veſſels, which convey Nouriſhm to it; wherefore it has neither Navel-ſt nor After-birth, from which (like an fant) it can receive any Suſtenance, w muſt of Courſe therefore come directly f the Veſſels of the *Uterus*. There are Ways of procuring the Diſcharge of *Mole*, either by endeavouring to make Woman her ſelf drive it out, or attempt to extract it by Manual Operation; it be the Surgeon's Duty always to begin w the moſt gentle Means, before he proceed thoſe of a harſher Nature. If the Wo is neither afflicted with a Fever, or Lo Blood, he may give her a ſomewhat vio Purgative, and ſharp and ſtimulating C ſters, which he may ſeveral times reite in order to excite Preſſures, which dilate *Matrix*, and make Way for the *Mole*: may make uſe of Butter to rub the inter Orifice, to render it the more ſubtile and latable: He may try emollient Injectio Bleeding of the Foot, or a gentle Bath, cording as he ſhall think fit. If the *Mol* but of an indifferent Bulk, and does ſtick very faſt, theſe Remedies may drive out; but if it is of an exceſſive Largen and ſticks very faſt, it requires the Surgeo Hand; but if the *Mole* be ſo big that it c not come out, the Operator muſt make of the ſharp edg'd *Crotchet*, in order to it out by Bits, when he cannot otherw ſucceed.

When a Surgeon is call'd to an impregn ted Woman, who has an *Hæmorrhage*, b fore he proceeds at all, he muſt examine Cauſe, in order to diſcover, whether it be *Menſtrual Flux*, or a real *Hæmorrhage*. The are certain Signs by which we may diſc ver the Difference betwixt the one and t other. The *Menſtrual Flux* runs by litt and little, and without Pain; it comes at regular Time, and ends after a ſhort Spac as two or three Days; it is not accompani with Clots, nor is it exceſſive. But the *H morrhage* comes with Pain, and almoſt a ways ſuddenly; the Blood flows out in gre Abundance, and continues ſo to do witho Relaxation; for if it ſeems to ceaſe for ſo Moments, the Blood in the interim does n leſs iſſue out of the Veſſels, when fallin into the *Vagina*, it clots: Theſe lump

comm

coming to be drove outwards, the Blood again begins to run out more than before; so that without Help, and speedy Delivery, both Mother and Child will perish. You ought not to be surprized that I talk of Women with Child having their Terms, of which we have so many Instances, that 'tis out of Doubt. Some Women only have them the first Months, others void something till the fifth or sixth Month; and there are yet others from whom they run during the whole Time of their Pregnancy, which very frequently deceives Women; whence it is that they don't certainly know whether they are with Child or no, nor when they conceived.

When the Flux is barely of the Terms, no more is necessary than to leave the Woman to Rest; but when 'tis an *Hemorrhage*, the Surgeon must examine whether it proceeds from the Fund of the *Matrix*, or from the Vessels of the *Vagina* and internal Orifice. The Way to be convinced of this, is to feel with the Finger whether the internal Orifice is dilated; and if in introducing it into that Orifice we advance so far as the Membranes of the Child, 'tis a certain Sign that the Blood comes from the Fund of the *Matrix*; but if on the contrary that Orifice is close shut, the Blood infallibly escapes from the Vessels which moisten that Orifice and the *Vagina*: In which Case the Surgeon has no more to do than to oblige the Woman to keep her Bed, bleed her, separate her from her Husband for some Time, and give her no Medicine, for fear of exciting or augmenting by that Means the *Hemorrhage*. Several Women have gone their due Time with their Children, tho the Blood which flow'd from them has been sometimes accompanied with Clots. When the Blood proceeds from the Bottom of the *Matrix*, 'tis always because the After-birth is wholly or partly separated, and it never rejoining, 'tis absolutely necessary that the Woman be delivered. But if the Blood issues forth in large Quantities without Interruption, as though it streamed from the Aperture of a large Vessel, or the Patient falls into a *Syncope* or *Convulsion*, her Delivery must not be deferred, whether her Time be expired or no, whether she have any Labour Pains or not, there is no other Way left to save her Life.

These Cases are very prejudicial to the Practitioner, for if on the one Side he reflects on what he has to fear with Regard to himself, he knows that he hazards his Reputation; or if the Woman dies in her Delivery, or a little Time after, for Want of a sufficient Stock of Blood to maintain the Circulation, the Publick then never fails, tho' unjustly, to lay the Blame at his Door; and if on the other Side he looks on the Woman, he knows that she must be delivered or die; whence it is that some Practitioners in this Art avoid as much as is possible this perplex'd *Dilemma*. Yet Christian Charity ought to balance us, and without any cautious Reserve what we ought not to do, prevail on us generously to chuse that of relieving the Patient. But before he begins, the prudent Surgeon ought securely to shelter his Reputation under his Prognostick, and to that Purpose to call together the Friends and Relations of the Patient in an adjacent Room, and remonstrate to them her dangerous Condition, acquainting them, that the only Way to save her Life is to deliver her, tho' at the same Time he can not answer for her Life, but Delivery may recover her from a Death which is unavoidable without it. This done, the Surgeon immediately causes the Woman to be laid athwart the Edge of the Bed, her Legs wide extended, and held bent at the Knees by two Persons, others continuing behind, to prevent her shrinking backwards at the Time of Operation. Then he introduces his Hand into the *Vagina*, advancing first one Finger, afterwards two, and lastly a third, if he can, into the internal Orifice of the *Matrix*, with which he dilates it by gentle and slow Degrees. If the Membranes of the Child are not open, he breaks them with his Fingers, which makes Way for him to turn the Infant, in order to draw it out by the Feet.

When he hath gotten the Feet together, he pulls them with a warm Cloth, that they may not slip in drawing, always taking Care that the Face be turned downwards, for fear the Chin should catch upon the *Os Pubis* when it comes into the Passage. When the Child is born as far as the Cartilage of the Breast, he slips in his Right Hand forwards, in order to extend the Child's Arm along the Right Side of the Body, and that done,

done, does the ſame to the other Arm. When it comes to the Head, the Surgeon muſt not pull too hard, for fear of ſeparating it from the Body, which ſometimes happens: Nor ought he to ſuffer the Child to remain too long in that Poſture, for fear it be ſtrangled. He muſt oblige ſome Body to hold the Child up, whilſt he glides one Hand around the Head, in order to diſengage it by little and little; then put the Middle Finger of the other into the Child's Mouth, and preſently oblige the Perſon which holds up the Body to draw it out, which is done with much more Eaſe this Way, than if the Surgeon did not help by his two Hands after this Manner.

The Infant being in the World, the Surgeon eaſily compleats the Delivery of the Woman; by reaſon that the After-birth, in theſe Kinds of *Hæmorrhages*, is always ſeparated from the *Matrix*. As ſoon as the Woman is delivered, her Flux begins to decreaſe, and ſoon after wholly ceaſes, becauſe the *Matrix* in its cloſing again ſtops the Orifices of the Veſſels from whence the Blood flow'd, and which were kept open by the Diſtention which the Child occaſioned when in this Part; ſo that if we ſhould not draw out the Child, the Blood would iſſue out at theſe Orifices to the laſt Drop. Notwithſtanding all the Fatigues which attend the Laying of Women in theſe Circumſtances, the Surgeon has ſometimes the Chagrin to ſee the Patient expire ſoon after her Delivery. Five or ſix Hours being paſt after her Delivery, and ſhe having had Time to take ſome Refreſhment of Chicken Broth, or the like, to repair her loſt Blood, ſhe is ſafe; but if ſhe ends her Life half an Hour or an Hour after her being brought to Bed, 'tis becauſe ſhe had not Blood enough remaining in her Veſſels to preſerve its circular Motion.

When the Child's Head does not preſent to the Paſſage, the Delivery is term'd laborious, becauſe the Infant not being in its natural Situation, can hardly come out of the *Matrix* without the Aſſiſtance of a Surgeon or Midwife. It may preſent it ſelf in an infinite Number of Poſtures; but the worſt of all is, when one Hand comes out firſt. When a Surgeon knows how to relieve a Woman in theſe Sorts of Labours, he is undoubtedly able to help them in all others, that being the moſt difficult of all. If t Midwives would call us to help them wh they feel the Hand of the Child, as ſoon the Waters are broke, we ſhould turn t Child with more Eaſe; but they often do n deſire our Aſſiſtance, till they have tried deliver the Woman by drawing the Chil Arm outward; which they having engag in the Paſſage, it renders the Delivery mo laborious and difficult. The Surgeon wh is called on ſuch an Occaſion, after inform ing himſelf how long the Hand has been ou begins with feeling the Pulſe of the Child, diſcover whether it be dead or alive. If b the Beating of the Pulſe he finds it aliv he makes the more Expedition. Then h cauſes the Woman to be laid on her Back o the Edge of the Bed, as in the Caſe b fore, and prepares himſelf to turn th Child, in order to take it by the Feet, becau he muſt not pretend to be able to ſave it an other Way; for he would ſooner pull o the Arm of the Child, than draw it out b that Member. When an Arm is in the Pa ſage, the Child lies athwart it, with its Hea on one, and the Body on the other Side o the *Uterus*, in which Poſture 'tis impoſſibl it ſhould ever come forth. It muſt then b turned; in order to perform which, the Su geon examines whether the Child's Hand b the Right or the Left, and conſiders whic of his own Hands he ought to make Uſe o He alſo obſerves whether the Palm of th Child's Hand be upwards, which ſhews hi that it lies on its back, for if downwards would be the Reverſe.

Theſe Obſervations having determine him, he gently introduces his Hand into th *Matrix* along by the Child's Arm, which h graſps near the Shoulder, in order to puſh towards its Head, and obliging it to mov out of the Paſſage, he makes Way for th Feet to approach, in order to find them th more readily, and ſecure them. He muſt a ſoon as he has got one of them draw forth, which will make the Child of it own Accord turn it ſelf to a more favoura ble Situation; but ſometimes, before ſearch ing for the other Foot, it will be proper t tie the firſt with a Ribbon, becauſe if th Child ſhould withdraw it whilſt the Opera tor is employ'd in Queſt of the other, h would be obliged to ſearch for the firſt a ſe

cond Time. The Surgeon having got one Foot, ſlides his Hand up to the Top of the Thigh on the ſame Side, whence he paſſes to the other, ſlipping his Hand to the Foot, which he brings to the Paſſage to the firſt, in order to draw them both out, holding them with a warm Cloth, that they may not ſlip. If the Child lies on its Belly, he continues drawing of it out immediately; but if on its Back he turns it in Proportion to the Advances he makes in drawing it out; and in all other Particulars he manages himſelf as already laid down. If the Arm is ſo far driven out, or is ſo large, as not to allow Room for the Surgeon to introduce his Hand, and there appear certain Signs of the Death of the Child, *Ambroſe Parey* adviſes us to cut off the Arm; but we ought to be well aſſured that the Child is dead, which we may certainly be, if by feeling the Pulſe we do not find any Pulſation. Ancient Authors tell us, that we ought to reduce to their natural Poſture whatever is ſituated contrary to Nature; that is, that we ought to reduce all Infants in the *Matrix*, or its internal Orifice, to lie with the Head foremoſt: But daily Experience ſhews us, that this is not always practicable; for it is impoſſible to bring the Head into the Paſſage, becauſe there is no Hold to be taken of it, but it is not very difficult to draw the Feet thither, becauſe we can graſp and guide them whither we pleaſe.

There are Signs which diſcover the Death of a Child in the *Matrix*, the principal whereof are, the Woman's feeling a great Weight at the Bottom of the *Hypogaſtrium*, her Belly falling, and the Child falling like a Bowl to that Side on which ſhe lies; if touching the Navel we find no Manner of Pulſation, if an Arm or a Leg hanging out we find the *Epidermis* eaſily ſeparate; if blackiſh, ſtinking and cadaverous Humidities iſſue from the *Matrix*; and laſtly, if the Mother no longer perceives it move, then the Surgeon has no Room left to hope for Help on the Child's Part, who like a Maſs of Lead is wholly unable to make any Effort in Order to get forth, unleſs it be by its own Weight, which renders the Labour very long and painful. Nor ought we to expect much from the Mother, whoſe Pains on this Occaſion are ſo feeble and ſlow, that they are not ſufficient to bring forth the Child. Nay it happens ſometimes that ſhe has none, which lays the Surgeon under a Neceſſity of helping her, without which ſhe cannot be delivered. If the Child is in a proper Poſture, he ought to rowſe the Pains, which are as it were aſleep, by ſtrong and active Clyſters, that ſtimulate the Inteſtines, and facilitate the Birth. I am not of Opinion to oblige the Patient to internal Remedies, ſuch as are thoſe that eaſe and compoſe to Reſt, or violent ſtrong Medicines, that provoke to Labour, for they are dangerous, and may occaſion cruel Symptoms. If theſe Clyſters have not their expected Effect, the Surgeon ought to go to Work, and endeavour by Manual Operation to draw out the dead Child as ſoon as he can.

To perform this Operation, he muſt cauſe the Woman to be placed in the Poſture already mentioned, and if it be long ſince ſhe made Water, he muſt introduce a *Catheter* or *excavated Probe* into the Bladder to diſcharge the Urine, which filling that Veſſel will incommode the Delivery; then ſliding his Right Hand into the *Matrix*, if he does not find the Child's Head too far engaged in the Paſſage, he puſhes it back, and ſliding his Hand under the Child's Belly, he ſearches for its Feet, in order to turn it, and bring it forth purſuant to the precedent Article, taking ſpecial Care not to pull too hard when the Head ſticks, for fear of beheading the Child, which by reaſon of its Putrefaction may happen, if it be drawn with too much Precipitation; but if the Child be deprived of its Head, it muſt not be left in the *Matrix*, but extracted by a blunt *Crotchet* fix'd on one Side of the Head, while the other Hand reſts on the ſame *Crotchet* to conduct it forth.

But if the Child's Head preſenting firſt is ſo far advanced and engaged in the Paſſage, that it cannot be ſhoved back without offering too much Violence to the Woman, the Surgeon muſt endeavour to bring it out in that Poſture; and the Head being round and Slippery, by reaſon of the Humidities in which it has been moiſten'd, ſo that he cannot take any Hold of it with his Hands, he muſt have Recourſe to a ſharp pointed *Crotchet*, which he thruſts as far as he can betwixt the *Matrix* and the Child's Head, guiding

guiding that Inſtrument with the Palm of one of his Hands, with the Point turn'd towards the Head, which it muſt fix upon in a ſolid Place, that it may not ſlip from it. Being thus fixed, he brings forth the Head, by applying his Left Hand to the other Side of it, oppoſite to the *Crotchet*, in order to help to diſengage and conduct it directly through the Paſſage. If his Hand be not ſufficient, he takes a ſecond *Crotchet*, which he introduces in the ſame Manner as the former, and fixes on that Side of the Head where his Hand was. With theſe two *Crotchets* he draws forth the Child equally, how big ſoever it may be. If after the Head is come forth the Child ſticks by the Shoulders, he diſengages them by ſlipping one or two Fingers of each Hand under the Arm-pits, in order by that Hold to draw the Child wholly out. When he is obliged to cut the Child in Pieces, either by Reaſon the Paſſage cannot be ſufficiently dilated, or the exceſſive Bulk of the Child's Parts, he makes Uſe of a *Crotchet* ſhaped like a crooked Knife.

Womens Labours are generally followed by ſo many grievous Accidents, that it would be difficult to particularize them all. I ſhall only mention two, becauſe they require Manual Operation: One is the Rupture of the under and Forked Part of the *Rima Magna*, or *Foſſa Navicularis*; and the other the *Procidentia Uteri*, or falling out of the *Matrix*. The Name of Forked is given to the lower Part of the *Vulva*, from its being of that Figure. It makes the Separation betwixt the Grand *Fiſſure* and the *Anus*. It frequently happens that by hard Labours this Part is broken, ſo that the two Apertures, that of the *Matrix* and that of the *Anus*, are run into one; wherefore the Surgeon muſt remedy this Dilaceration by ſome Stitches of the Needle; but before the Wound is ſowed, it muſt be waſhed, and well cleanſed with warm Wine, and before cloſing the Stitches the Surgeon muſt apply to the Part the White *Peruvian Balſam*, or that of *Arcæus*, in order to healing the Wound. On that Side next the *Vulva* muſt be applied an aſtringent Plaiſter, as well to reunite, as to defend it from the Urine, whoſe Acrimony would excite Pain, and hinder its Re-union.

Scarce any Indiſpoſitions are more frequent than the *Deſcent* and falling out of the Womb; an infinite Number of Women are afflicted with it, and this Sort of Diſeaſe is more difficult to cure, by reaſon Women out of Modeſty will ſuffer long before they complain. We muſt diſtinguiſh betwixt the *Deſcent* and Fall of the *Matrix*; the firſt is, when the *Fund* or Bottom of the *Uterus* deſcends from its Place, and falls into the *Vagina*; and the ſecond, when the ſame falling lower comes entirely forth: So that the *Deſcent* is properly no more than a Relaxation of the Body of the *Matrix*, whilſt the *Falling* is a *Precipitation*.

All *Deſcents* of the *Matrix* are not alike; for the *Uterus* often proceeds no farther than to occaſion a Weight in the *Vagina*; at other Times it deſcends as low as the *Caruncles*, and then with the Finger we feel the internal Orifice very near; and at other Times deſcending yet lower, the internal Orifice appears without the *Privities*.

The Fallings or *Precipitations* of the *Matrix* are of two Sorts; one is, when the *Matrix* falls out without its *Fund*, being turned the wrong Side outwards. In this Caſe, we ſee the internal Orifice at the Extremity of a great round fleſhy Maſs, which is the Body of the Womb. The other is, when that Part is not only fallen out, but when its Fund is entirely turn'd Inſide outwards, in ſuch Manner, that it ſeems to be nothing but a great Piece of bloody Fleſh hanging betwixt the Woman's Thighs. 'Tis always a Relaxation of the large Ligaments of the *Matrix* which permits it to deſcend or fall, and never a Rupture of the Ligaments, as ſome have imagined. A thouſand Accidents cauſe theſe Relaxations: I ſhall not recite them here, but content my ſelf with hinting only that the principal of them proceed from hard *Labour*. In theſe Indiſpoſitions, the Women feel an extream Pain in the Region of the Reins. They complain of a heavy Weight at the Bottom of the Belly, which is often accompanied with a Difficulty of Urine, and they require ſpeedy Help, if they are willing to be cured; for the older theſe Infirmities grow, the more difficult 'tis to compleat their Cure, which conſiſts in two Particulars, firſt to return the *Matrix* to its natural Situation, and ſecondly to contain and fix it there.

T

The ſimple *Deſcents* of the *Matrix* don't require a great Operation; but firſt of all we muſt examine the Cauſe of them. If the *Uterus* is only tumefied by the Suppreſſion of the Terms, which renders it ponderous, the Surgeon muſt procure Evacuation; and if by reaſon of the Weakneſs of the Ligaments it deſcends too low, it muſt be fortified by Aſtringents and Corroboratives boiled in thick Wine, in which the Surgeon dips his Bolſters, which he applies to the Reins and Belly, after having reduced the Part to its Place; which is ſometimes accompliſh'd by barely making the Woman lie down on her Bed, or by laying the Palm of his Hand on her Lower *Venter*, and puſhing up the *Matrix*; or by introducing into the *Vagina* a Wax Candle excavated like a Pipe, with which we inſtantly return it to its natural Place. Some affirm the Husband's Yard to be a proper Inſtrument, but the Action thereof rather cauſes the *Uterus*, after it is puſhed up, to fall lower than before.

In the *Fallings* of the *Matrix* in which the *Fundus* is not turned Inſide outwards, the greateſt Difficulty lies not in reſtoring it to its Place, but in keeping it there when replaced. The moſt certain Remedy to be made Uſe of againſt its falling out again is a Peſſary, which muſt be introduced into the Neck of the *Uterus*, in order that by ſuſtaining the Bottom thereof it may keep it in its ordinary Situation. The Matter of which *Peſſaries* are made is commonly Cork, that they may be the lighter. They are dipped in Melted Wax, to fill up their Cavities, that their uneven Surface might not hurt. They are of two different Figures; ſome are oval, and ſhaped like an Egg, the Bulk and Length proportioned to the Neck of the *Matrix*, into which they are to enter, to which is faſtned a ſmall String, which has two Uſes, one to draw the *Peſſary* out when we think fit, and the other to faſten it to a Ribbon or Tape which goes round the Body, to hinder it from falling to the Ground, if the Patient happens to walk abroad, which theſe *Peſſaries* are apt to do, particularly in the Time of the Menſtruous Flux. There are *Peſſaries* of other Shapes; ſome are circular, and others ſomewhat inclining to oval, ſhaped like a ſmall Roll. In the Middle they are pierced through, and a Hole left large enough to allow Paſſage to the Women's Terms, and which admitting the internal Orifice into its Cavity, retains it in its Place, and ſupports it. They are made a little large, to the End that, entering with a little Force, they may the better ſtay in. One of theſe two ſtands in Need of a String to withdraw it, but the other wants none, the Finger being ſufficient to pull it out at Pleaſure, Theſe *Peſſaries* once placed muſt not be drawn out on account of the Neceſſities of Nature, by reaſon that, being provided with a Hole, a free Paſſage is left for the Excretions of the *Matrix*; and if they are well made, they don't incommode that Woman that wears them, nor hinder her converſing with her Husband, or even being impregnated, becauſe the internal Orifice may receive the Seed that is emitted.

In the *Fallings* of the *Matrix* in which the *Fundus* is abſolutely turned Inſide outwards, as we would turn a Purſe, we muſt expeditiouſly thruſt it in; and this Accident very frequently happening through the Fault of the Midwives, who pulling the *Navel-ſtring* too hard to get out the After-birth, bring along with it the Bottom of the Womb, to which it ſticks. As ſoon as they perceive the *Fundus* to follow the *After-birth*, it muſt be ſeparated, and the Bottom of the *Uterus* reſtored, by thruſting it again into its Place, which is then eaſily done, becauſe the internal Orifice was extreamly dilated, to let the Child paſs out. But if the Midwife defers it, the Orifice cloſes by little and little, in which Caſe 'tis very difficult to reſtore the *Fundus* to its Place, and the Woman dies before ſhe is helped. Nevertheleſs if the Surgeon be called Time enough to remedy this turning outwards of the *Matrix*, which he will diſcover by ſeeing betwixt the Woman's Thighs a Sort of Bloody *Scrotum*, he then begins by obliging the Patient to ariſe, and ordering a Clyſter to be adminiſtred, if it was long ſince ſhe had been at Stool. He then makes her lie on her Back, with her Buttocks raiſed higher than her Head; then after having with warm Wine and Water fomented all that's come out, he gently thruſts it back into its appointed Place. If it is not to be got in without too much Difficulty, he muſt make an *Embrocation* with Oil of ſweet Almonds, which will help the

Reduction, by rendering the Fibres of the Organ ſofter and more extenſible. But if notwithſtanding all the Surgeon's Endeavours, the *Matrix* cannot be got in again, either by reaſon 'tis too much tumefied, or that it has been delay'd too long, 'tis in great Danger of gangrening in a little Time. Some Authors adviſe us in this Caſe to extirpate it, and aſſure us to have ſeen Women thus cured; but as for me, I ſhall believe the Extirpation of the *Matrix* mortal, till I ſhall be convinced by Experience.

The Orifices, as well as the Neck of the Womb, are liable to ſeveral Indiſpoſitions, which reſult from hard Labours; but they not requiring Manual Operation, I ſhall leave them to the Prudence of thoſe concerned in the Management of them. But if the Infirmity is in the Neck of the Womb, there muſt be a *Dilator* made Uſe of, which being introduced into the *Vagina*, will ſeparate the Lips, and enable the Spectator to ſee the Infirmity; but if there be an Ulcer at the internal Orifice, then uſe the *Speculum Matricis*; It has three Branches, which join'd together are thruſt gently into the [N]ſ the *Matrix*, then turning a Screw they [ſ]rate from one another, and by the [ſ]which they leave betwixt themſelves, [a]the Surgeon to take a diſtinct View of [t]internal Orifice; which at firſt Sight [w]ſatisfy him of the Infirmities with whi[ch]is afflicted, and facilitate the Applicati[on]neceſſary Remedies.

But at preſent the moſt able Practitio[ners]of the Art of *Midwifry* content themſel[ves]with the making Uſe of their Fingers, t[wo]of which they engage one after another [in]the *Vagina*, with which they dilate the P[a]ſage triangularly, and that as much a[s]neceſſary to perceive all that prejudices [t]*Uterus*, which are as well diſcovered by [t]Touch as the Eyes, and that in a Manner [le]incommodious to the Patient, and more [de]ſtructive to the Examiner, than if he m[ade]Uſe of a *Speculum Matricis*, by the Help [o]which we are not ſo well informed w[here]we are in Danger of breaking ſome Fibre[s]Dilation.

Several Figures of the Parts of Generation in Wom[en] Taken from Swammerdam.

TAB. VIII.

Fig. I. *The fore Proſpect of the* Uterus *of a Woman after Delivery.*

A, A. The Spermatick Arteries.
B, B. The Spermatick Veins diſtributed through the *Tubes* and *Fundus* of the *Uterus.*
C, C. The *Corpora Pyramidalia*, compoſed of the Spermatick Arteries and Veins.
D, D. The membranous or broad Ligaments of the Womb, through which the Blood Veſſels paſs to the *Fallopian Tubes*, called by ſome *Alæ Veſpertilionum.*
D, E. The *Fallopian Tubes* well expreſs'd.
F, F. Their Aperture at the *Expanſum Foliaceum* on each Side.
G, G. The round or inferior Ligaments [of] Womb.
H. The Origination of the Veins and [Ar]ries of thoſe Ligaments.
I. The Valve in the Vein of the round [Li]ment, hindering the Relapſe of the [Bl]to the *Uterus.*
K, K. The two *Hypogaſtrick* Arteries.
L, L. The *Hypogaſtrick* Veins variouſly [di]torted, and in their Progreſs impl[ex]and perplex'd with the Arteries.
M. Fundus Uteri.

N.

Pag. 382. Vol. 3.

Tab. VIII.

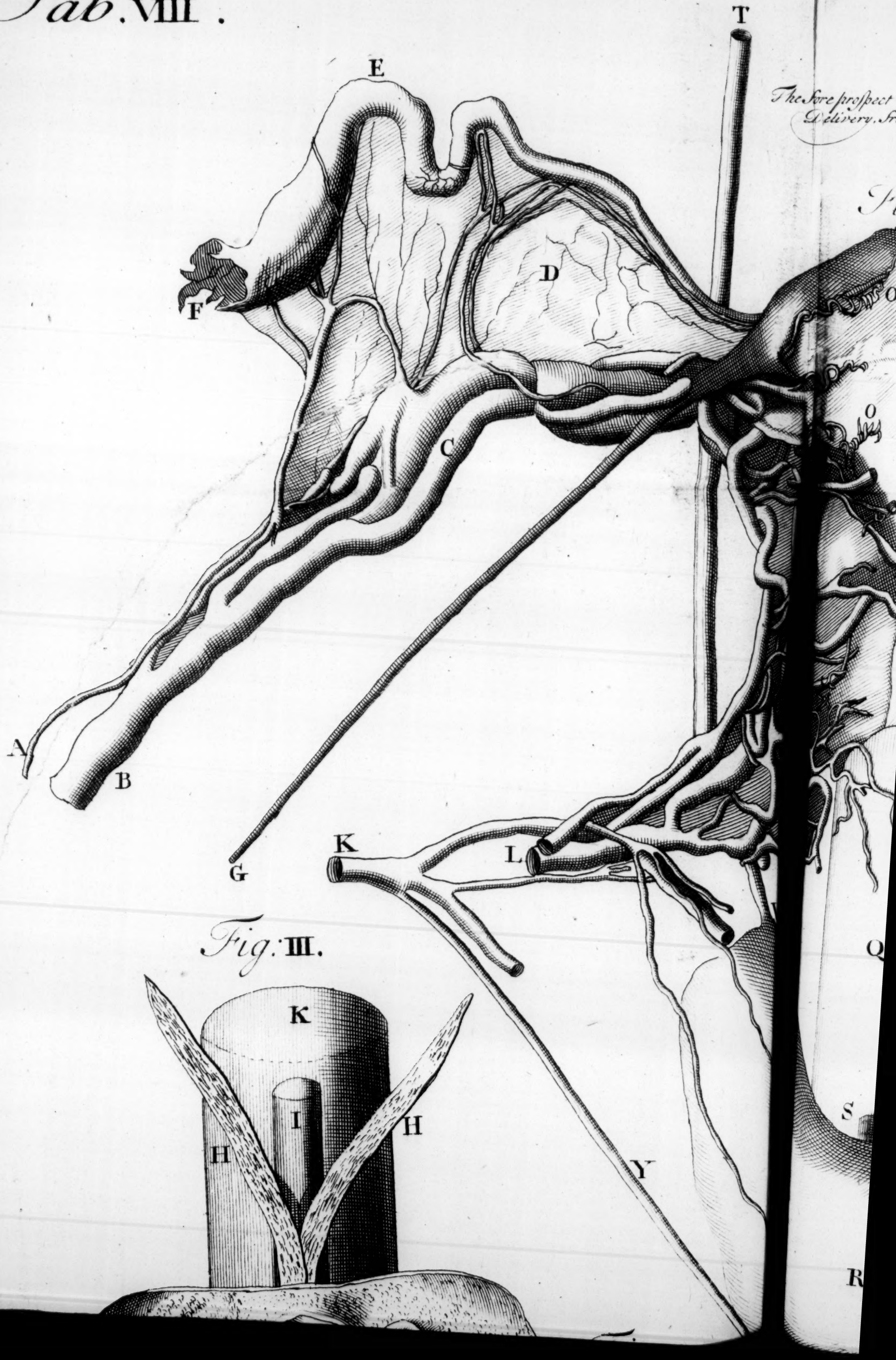


Fig: III.

of the Uterus of a Woman after
from Swammerdam

Fig. I.

Fig. II.

A
B
G
K
L
V
Y

Fig. III.

K
I
H
H
D
C
C

The Pudendum of a Virgin with its Clitoris dried.

Fig. IV

B
A

The Perforation or Slit of the Hymen.

N

L

L

K

G

Q

V

Y

S

R

X

Fig. II.

A

C

D

D

C

E

F

The Pudendum of a Virgin taken fresh out of the Body.

Tab. IX.

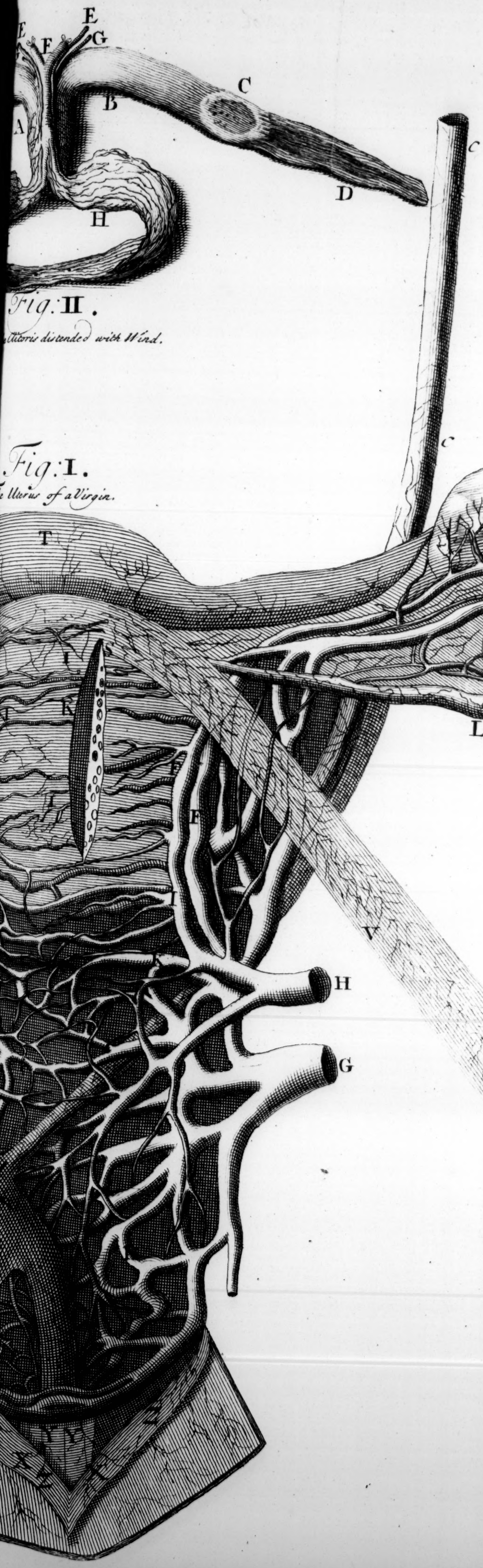


Fig: II.

Uterus distended with Wind.

Fig: I.

The Uterus of a Virgin.

. The *Cervix* or Neck of it, at the End of which is the inner Orifice of the Womb.
O, O. The Arteries on the *Fundus* or Bottom of the Womb, curl'd like the Tendrils of a Vine.
P. A great Number of Veins running over the exterior Tunick of the *Uterus*, in which the *Anaſtomoſes* are ſingularly remarkable.
. The *Vagina Uteri.*
R. The Bladder of Urine inverted, to ſhew the Tortuoſity of the Arteries of the *Vagina*, by which Means its proper Veſſels are repreſented ſomewhat longer than ordinary.
S. The Orifice of the *Urethra* in the *Vagina.*
T, T. The Ureters.
V, V. The Inſertion into the Bladder, which is here turned downwards.
X. Part of the *Urachus.*
Y, Y. The Umbilical Arteries.

g. II. *Exhibiting the* Pudendum *of a Virgin taken freſh out of the Body and diſplay'd.*

. The *Glans* of the *Clitoris*, reſembling that of a *Penis.*
. The *Prepuce* of the *Clitoris.*
C. The *Labia Pudendi.*
D. The *Nymphæ.*
E. The Orifice of the *Urethra.*
F. The Caruncle that cloſes the *Meatus Urinarius*, in which are divers *Fiſſures.*
G. The *Hymen.*

Fig. III. *The* Pudendum *of a Virgin, with its* Clitoris *dried.*

. The *Glans* of the *Clitoris*, anſwering that of a Man.
. The Prepuce of that *Glans.*
C. Labia Pudendi.
D. The *Nymphæ.*
. The Orifice of the *Meatus Urinarius.*
. The *Hymen.*
G. The Perforation of the *Hymen.*
H, H. The *Crura* of the *Clitoris* cut, to ſhew the Subſtance of its cavernous Bodies.
I. The Urinary Paſſage cut off near the Bladder.
K. The Neck of the *Uterus* cut off.

Fig. IV.

. The Perforation or Slit of the *Hymen.*
B. The upper Part of the *Hymen* next the *Meatus Urinarius.*

TAB. IX.

Fig. I. *From the ſame Author, ſhews the* Uterus *of a Virgin.*

A. The Spermatick Veſſels, from their Riſe to their Diſſemination through the *Ovaria, Tubes*, and *Fundus Uteri.*
B. The *Corpus Pyramidale* on each Side, compoſed of Branches of the Spermatick Artery and Vein.
The Left *Teſticle* or *Ovary*, covered with its proper Membrane, through which Eggs appear protuberant.
D. The *Diſtribution* of the *Spermatick* Artery and Vein upon the Left *Ovary.*
E, E, E, E. The Branches of the ſame Veſſels marching over the membranous Ligaments, or *Alæ Veſpertilionum*, to the *Tubes* on each Side.

F, F, F, F. The Spermatick and Hypogaſtrick Veſſels, which run curling together along the Sides of the Neck of the *Uterus*, under the *Tubes* and round Ligaments, and inoſculate freely on each Side.

G, G. The Hypogaſtrick Veins.

H, H. The Hypogaſtrick Arteries.

I, I, I, I. The *Anaſtomoſes* of the Arteries expreſs'd.

K, K, K. The various Implications and numerous Inoſculations of the Veſſels finely expreſs'd.

L, L. The Left Tube or Horn of the Womb.

M. The Aperture of the Tube diſplay'd, with its Fringe, reſembling the tatter'd Edges of a worn Cloth.

N. The Membrane of the *Teſtis* ſeparated and turned back, to ſhew the *Ova* and the Spermatick Veſſels going to and from them.

O. The right Tube inverted, to ſhew its Capacity, through which the *Ova* deſcend to the *Uterus*.

P. The Fringe of the Right Tube.

Q. The *Fundus* of the Womb obſcurely protuberant.

R. A Slit in the Body of the Womb.

S. The Subſtance of the Womb, in which appear the Orifices of the Blood Veſſels cut tranſverſly.

T. Part of the Membrane covering the *Inteſtinum Rectum.*

V, V. The round Ligaments, which are nothing but the Arteries and Veins which go to the *Clitoris* and *Pubes*, wrapp'd up in their proper *Involucrum* or Tunick.

X, X. The *Crura Clitoridis*, or its Divarications, called by *Swammerdam Crura externa.*

Y, Y. The cavernous Bodies of the *Uterus*, taken Notice of by *De Graef* under the Name of *Plexus Reticularis*, but here called *Crura Clitoridis interna.*

Z, Z. The Veſſels of the *Clitoris.*

a. The Bladder of Urine turned towards the Right Side.

B. The Inſertion of the Neck of the Bladder near the *Clitoris.*

C, C, C, C. The *Ureters.*

d, d. The Inſertion of the *Ureters* into the Bladder.

e, e. A *Hydatis.*

f, f. The Valves of the Veins.

Fig. II.

A. The Body of the *Clitoris* diſtended with Wind, as it is with Blood *in Coitu.*

B, B. Its *Crura* alſo diſtended.

C, C. The Extremities of the *Corpora Cavernoſa* of its *Crura* cut from the *Oſſa Pubis.*

D, D. The *Muſculi Erectores Clitoridis* freed from the *Oſſa Coxendicis*, and left at their Terminations.

E, E. The Arteries.

F. The great Vein,

G, G. The Nerves of the *Clitoris*, which paſs likewiſe to the *Corpus Cavernoſum Pudendi.*

H, H. The *Corpus Cavernoſum Pudendi* inflated by the Vein of the *Clitoris*, *F.*

Of

Of Delivering Women, *and the Diſeaſes attending them, by Monſieur* de la Vaugion, M. D. *and Intendant of the* Royal Hoſpitals *about* Paris.

THIS Operation is an Extraction of the Child, together with the Membranes which contain it, and the *Placenta* or After-birth, out of the Mother's Womb.

The Cauſe of a Big Belly is the Child contained in the Womb.

The Signs which demonſtrate Conception, are the mutual Conjunction or Coition of both Sexes: If after Reception of the Male *Semen* the Womb is cloſe, nothing comes away, and the Man's Yard is not ſo wet as uſual; this is a Sign there is a Conception, and that the Maſculine Seed is retained in the Womb.

A Woman after Conception feels ſome ſmall Pain round about the Navel, and ſome Working in the lower Belly, which ariſes from a ſtrong Contraction of the Womb, when it cloſes it ſelf, which creating a Motion in the Bladder, draws down the *Urachus*, which terminates in the Navel, and this creates a little Pain in that Part. This Commotion of the lower Belly proceeds from the Irritation of the *Rectum*, by the Motion of the Womb which lies on and is appended to it.

It is obſervable, that the internal Orifice of the Womb, in Women who have had Children, is not ſo exactly cloſed in the Time of Conception, as in Women who never had a Child.

The *Nauſea*, the Loſs of Appetite without any viſible Diſtemper, a Longing after odd and uncommon Things, Sickneſs and Vomiting continuing for a long Time together, Liſtleſsneſs, Dozineſs, Frowardneſs, and ill Humour without a Reaſon, Pains in the Teeth to which ſhe was not ſubject before, extraordinary Spitting, Retention of the Courſes, or Evacuation of them at an unuſual Time; Riſing of the Breaſts, a Hardneſs and Pain in them, the Nipple growing hard, and encreaſing in Bigneſs a little (becauſe of the Repletion); the encreaſing of the little Circle, its brown Colour, the Protuberance of the Navel, the Softneſs and Laxity of the Eye-lids, which are difficultly kept open, their heavy Aſpect, with a Yellow Livid Circle round them; the Eyes ſunk, their Whites turbid, a languiſhing Look, the Blood let out bad, Emaciation, a big Belly, which gradually encreaſes; all theſe after Coition are Signs of Conception, all which ſometimes appear at once, and ſometimes only Part of them.

The Reader ought here to obſerve, that ſeveral of theſe Signs happen to Maids in a Retention of their Courſes; as for Inſtance, *Nauſea*, Vomiting, though not ſo frequently; Riſings, Hardneſs and Pain in the Breaſt and Belly, Appetite to odd and uncommon Things, livid Eyes, their Womb may be cloſed. On the contrary, Women may ſometimes have their Courſes the whole Time of their going with Child, but not in ſo great Plenty as at other Times.

Of the Signs which precede and accompany a Natural Delivery.

Sometimes the Life of the Mother, as well as that of her Child, is indanger'd by haſtning her Delivery, before the Term of her going with Child is compleated.

Cholick Pains, ariſing from Wind impriſoned, and moving to and fro' in the lower Belly, which ruſling up and down are not directed to the lower Part of the Womb, (as all Throes in a true Labour) are no Signs that a Woman ought to be delivered. Theſe Cholick Pains are diſperſed by

by warm Cloths applied to the Belly, or carminative Glysters, whereas these augment the Pains in real Labour. These counterfeit Pains may sometimes proceed from a *Diarrhœa*, or the Paroxysm of a Fever.

The true Signs which precede a Natural Labour, and happen within a few Days before, are unusual Pains in the Reins, the Rising of the Belly which was above falls down, which makes the Woman walk with more Difficulty than before, and stimulates her to Urine, because the *Fœtus* bears down on the Bladder: Lastly, a Flux of glairy Humour from the Womb, which humects the Parts, and dilates the Passage of the Infant.

The Signs which accompany Labour are great Pains in the Back and Reins, which redoubling by Intervals, terminate at the Bottom of the Belly with repeated Throes. The Woman has a fuller, quicker, and higher Pulse than ordinary; her Face is red, and inflamed by the vehement Efforts she makes to help the Birth. The Natural Parts are tumefied, because the Infant struggles to get out; and if Vomiting supervene, it is a Sign that the Child will soon be born. This Vomiting arises from a certain Sympathy between the Womb and Stomach, because of the Communication of Nerves between those Parts.

When the Delivery is near, there happens an universal Trembling, especially in the Thighs and Hamms, a general Heat, and the Humours which then come away are often tinctured with Blood. The internal Orifice of the Womb is open, which may be felt with the Finger, and the Membranes containing the *Fœtus* present themselves: These appear harder and tenser, according as the Pain is more or less vehement. The Pains continuing, the Membranes break, and the Waters come away, and the naked Head of the Child presents it self to the Orifice.

When all or most of these Signs appear, it is certain that the Woman is near her Delivery, whether she have compleated her Term or not.

The OPERATION.

When you perceive by the above mentioned Signs that a Woman is really in Labour, take Care that neither her Cloaths any Thing else be about her Belly, wh may streighten it, and give her some pr strong Clysters before the Child be in Passage, to evacuate the *Rectum*, and prov the Woman to go to Stool. After this m a Bed for her, if it be Winter near the F The Bed ought to be so placed, that may commodiously go round it.

If the Woman be full of Blood, away some of it when the Pulse rises. Practice is useful to free the Breast, to a Respiraton, and prevent a great Loss of Bl or Fever after her Delivery. Then let take some good Broth, or a new laid E and let her walk in her Chamber, and fr Time to Time take a Spoonful or two Wine not too strong, because all he Wines, and strong Liquors, are apt to kin a Fever. When her Pains take her, ad her to help her Throes.

The Artist ought from Time to Time feel the internal Orifice of the Womb, discover whether the Waters are not re to break, which so soon as he perceives, must anoint the Place with some emolli Oil or Grease, and keep near the Patient, observe all her Motions, Complaints Pains, to make a Judgment whether her D livery be near, without being obliged so ten to try the Parts. Let the Patient e and anon rest on her Bed to recruit Strength, but she must not be suffered to on it too long, especially if it be a low Pa Bed, because by Walking the Weight of Infant dilates the internal Orifice of Womb, and the Pains are more vehem and frequent: On the other Hand, she m not be too much fatigued in her first Pa for fear her Strength be exhausted too soo

When the Waters present, let them br of themselves if the Labour be natural, cause if you should break them before Delivery, the Passage would be dry, more difficult for the Infant to slip throu After the Waters are broken, introduce Finger into the internal Orifice of the Wo to try if the Head of the Child presen self, which may be known if it be ha thick, round, heavy, and equal; for all ot Parts would be rough and unequal, hard soft, according as they differ.

For the delivering the Woman, place her
n a Bed covered with a Quilt, and not a
eather-bed, with Linen ſeveral Times dou-
led, to receive the Blood and Waters,
which come in great abundance from her)
nd prevent their incommoding her. The
oſt convenient Poſture to place her in is on
er Back, with her Head and Breaſt a little
aiſed, ſo that ſhe be neither lying nor ſit-
ing; for in this Manner ſhe will be able to
reathe more eaſily, and have more Strength
o help her Pains, than if ſhe were other-
iſe, or ſunk in her Bed. Being thus pla-
ed, ſhe muſt ſpread her Thighs abroad, fol-
ing her Legs a little toward her Buttocks,
hich muſt be raiſed by a ſmall Pillow un-
erneath, to the End that the *Coccyx* or Rump
one may give back. Laſtly, She muſt have
er Feet ſtayed againſt ſome firm Thing,
nd hold ſome of the Aſſiſtants by the Hand,
hat ſhe may better ſtay her ſelf during her
ains. The Woman muſt be encouraged to
old her Breath, and bear down her Pains
well and as ſtrongly as ſhe can. Here I
uſt condemn the Practiſe of ſome Mid-
ives, who preſs the ſuperior Parts of the
elly, to thruſt the Child gently down:
his bruiſes the Womb, and hinders the De-
very. The Artiſt ought to content him-
lf (having firſt anointed his Hand with
me Oils or Greaſes) to dilate the inner
rifice of the Womb, putting his Fingers up
to its Entry, and ſpreading them in the
me of her Pains, thruſting by little and
tle the Sides of the Orifice towards the
nder Part of the Child's Head.

When the Head begins to advance, the
rtiſt muſt ſeat himſelf conveniently to re-
ive the Child, and with his Fingers Ends
eavour to put back the inner Orifice of
e Womb over its Head, and as ſoon as it
advanced as far as the Ears, or thereabouts,
e hold of the two Sides with his Hands,
pping his Fingers under the Jaws, and up-
the firſt great Pain which comes, draw
forth. Here let him take great Care
t the Navel-ſtring be not entangled about
e Neck, or any other Part, leſt thereby the
ter-burthen be pulled with Violence, and
thit the Womb to which it is faſtened, and
it cauſe a Flooding, or break the String.
muſt alſo be obſerved, that the Head be
drawn forth ſtrait, but moving it to and fro', that the Shoulders may more eaſily make their Way; and this muſt be done without loſing Time, leſt the Head being paſt the Child be ſtopt by the Bigneſs and Largeneſs of the Shoulders, and ſo be ſuffocated in the Paſſage. As ſoon as the Head is born, he may ſlide his Fingers under the Armpits, and draw out the reſt of the Body.

When the Child is drawn forth, place it on its Side, with its Face towards you, leaſt the Blood and Waters which follow immediately after ſhould incommode it; or it may choak it by running into its Mouth or Noſe, as they would do if it were laid on its Back.

If the Woman's Pains continue after the Birth, and her Belly be big, and putting your Hand into her Body you find another Gathering of the Waters, it is a Sign there is a Child ſtill remaining in the Womb. If this be ſo, you muſt not endeavour to fetch away the After-birth till the Woman be delivered of all her Children, (becauſe Twins never have but one Burthen, to which there are faſtened as many diſtinct Strings and Membranes as there are Children) and if it ſhould be drawn forth after the Birth of the firſt, the reſt would run a Risk of loſing their Lives, and beſides it would endanger a Flooding.

For this Reaſon let the firſt String be cut, (being firſt tied with a Thread three or four Times double) and faſten the other End with a Thread to the Woman's Thigh, to prevent the Inconvenience it may cauſe by hanging between her Legs; and when this is done, break the Membranes of the Child which remains in the Womb to let out the Waters, and draw it out of the Mother's Body, obſerving the ſame Circumſtances as in the firſt, after which fetch away the After-birth in the following Manner.

How to fetch away the After-burthen.

When the Child is born, the Artiſt taking the String muſt wind it once or twice about one or two Fingers of his Left Hand, (for Inſtance, the fore and middle Finger join'd together) the better to hold it; or he may take it in his Left Hand, wrapping it in dry Linnen, to prevent it from ſlipping between his Fingers: Having done this, let him draw it mo-

moderately, and with the Right Hand take another Hold of it above the Left near the Privities, drawing likewiſe with that very gently, reſting the while the fore Finger of the ſame Hand extended, and ſtretched forth along the String towards the Entry of the *Vagina*, always obſerving to draw it from that Side where the Burthen cleaves leaſt. In performing this, he muſt avoid the Membranes of the Infant, which ſometimes hang out after the Birth, and inveſting the String, hinder him from keeping it firm. But above all Things, let him be careful to draw the Burthen gently, for fear of breaking the String, or drawing down the Womb with it, or cauſing a Flooding, which would be of dangerous Conſequence. In the mean Time the Woman may blow ſtrongly into her Hands, ſhut or ſtop her Noſtrils, or ſhe may put her Finger into her Throat, as if ſhe would excite Vomiting, or elſe ſtrive as if ſhe were going to Stool, bearing down and holding her Breath, all which Motions have the ſame Effect, and ſerve to looſen the Burthen, and facilitate its Expulſion. If this do not ſuffice, after you know on which Side the After-birth is ſituated, bid an experienced Nurſe-keeper preſs the Belly lightly with the Flat of her Hand, bringing it gently downwards by Way of Friction. When the Burthen is come away, it muſt be conſidered whether it be entire, and if the leaſt Part remain behind, ſo much as the Skirts, or any Clods of Blood, the Hand muſt be put up into the Womb to bring them out.

When the String is broke, and the *Placenta* is retained, you muſt ſpeedily introduce your Hand into the Woman's Body, and before the Womb can cloſe (having firſt anointed it with ſome Greaſe or Oil, and pared your Nails cloſe) bring it away. This is eaſy to be done, if it does not cleave to the Womb; but if it does adhere, you may eaſily diſtinguiſh it from the Womb it ſelf, by the ſeveral Inequalities in its Surface, and then by trying with your Fingers on which Side it cleaves leaſt, begin to diſingage it there, thruſting the End of your Fingers between it and the Womb, continuing ſo to do till it be entirely freed, and then gently draw it out. You ought to be careful in ſeparating the Burthen, to avoid ſcratching of the Womb, for fear of a Flooding, Inflammation or Gangrene, and it is better to leave ſome Part of it behind, than endanger ſuch Accidents.

If the Womb be not open enough to receive the Hand, anoint the Woman's Privities, and introduce two or three Fingers with which apprehend that Portion of the Burthen, which almoſt always preſents itſelf at the internal Orifice, and draw it gently, and a little obliquely on one Side and the other, and ſo proceed forwards keeping what you firſt ſeized in its Membranes.

If all theſe Methods fail, and you cannot fetch it then away, you muſt have Recourſe to Injections made with Decoctions of *Mallows*, *Marſhmallows*, *Pellitory*, *Linſeed*, with the Addition of *Oil of ſweet Almonds*, *Lillies*, or a Bit of *freſh Butter*: Theſe injected into the Womb are proper to ſuppurate, and ſo bring it away. Strong Clyſters are very ſerviceable, becauſe the Patients ſtriving to go to Stool, very much aſſiſts the Expulſion of the Burthen.

Bleeding in the Foot or Arm is neceſſary as Occaſion requires to prevent a Fever; but if the Woman be free from it, good Reſtoratives may be given her, as Broths made of Veal or Poultrey, with a little Juice of Orange, or Wine and Water.

Of difficult and unnatural Labours.

You may be aſſured the Child is living if the Woman has received no Hurt, if ſhe has labour'd under no very great Inconvenience during the Time of her going with Child if ſhe has enjoyed a good Health, and find the Infant ſtir within her.

If you doubt whether the Child be alive after the Waters are broke, paſs your Hand gently up into the Womb, and take hold of the String as near the Navel as may be to feel the Pulſe of the Umbilical Arteries or put the Tip of your Finger into its Mouth to feel the Motion of the Tongue.

You may conclude the Child to be dead if he has not ſtirred for a conſiderable Time if there be a Flux of fætid Matter from the Womb, if the Woman feels great Pain and Weight in her Belly, if the Womb be not ſtay'd, but falls like a Ball from one Side to another, on which ever Side ſhe happens to lie

ſhe; if ſhe have frequent *Syncopes* and Convulſions; if the Navel-ſtring or Burthen have for ſome Time been out of the Mother's Body; if (putting the Hand into the Womb) the Child be cold, the Navel have no Pulſation, and the Tongue remain unmoved; if the Head feel ſoft, and the Bones move to and fro, riding over one another in the Sutures; if the Woman has received any Hurt, or loſt a great Quantity of Blood, or ſhe be not arrived at her due Term; if the Waters have been broke for a conſiderable Time; if her Face be of a leaden Colour, her Eyes ſunk, her Looks faint and dejected, her Breath ill ſcented, her Breaſts decay'd, her Belly fallen, without any Waters coming away from the Womb. If divers of theſe Signs happen together, there is good Reaſon to believe the Child is dead.

When the Child preſents with the Feet firſt.

When this happens, the Artiſt muſt introduce his Fingers into the Womb to dilate it by ſpreading them. When the Paſſage is wide enough, introduce your Hand into the Womb; and if only one Foot preſent, conſider well whether it be the right or the left, and ſo you may better judge on which Side the other Foot lies, which you muſt ſearch for, and ſo draw forth both together. But before you proceed thus far, you muſt be well aſſured that this is not the Foot of another Child; for you would ſooner kill both Mother and Children, than deliver her after this Manner. You may eaſily prevent Miſtakes of this Kind, by ſliding your Finger along the Leg and Thigh to the Twiſt, till you find the two Thighs joined to one Body; and this Way has this Convenience, that at one and the ſame Time you find the other Foot, in order to bring it away with the former. When one Foot is found, tie it with a Riband, that ſo you may not loſe that again in ſearching for the other. When both Feet are found, taking them with both Hands above the Ankles, and holding them cloſe together, draw them till the Thighs and Hams of the Child are come forth: As ſoon as the Knees are come out, take hold of the Thighs above them, wrapping them in a Napkin, to prevent the Hand from ſliding, and then proceed to draw the Child to the upper Part of the Breaſt. Then bring down the two Arms of the Child on the Sides of the Body, taking hold of his Hands near the Wriſt, rather than in any other Place. This is the beſt Way to diſengage them in the Paſſage, and here Care muſt be taken to prevent breaking them by forcing them too much. You muſt be careful the Child's Belly and Face be downwards, to prevent the Chin from ſtopping on the Sharebone; wherefore if it be not in this Poſture, you muſt reduce it, which may eaſily be done. To effect this, ſlide the Flat of one Hand to the *Pubes* of the Child, and with the other hold the two Feet, turning the Body till the Breaſt and Face be downwards: Having in this Poſture brought the Child to the Shoulders, you muſt proceed to draw it out, in the mean time adviſing the Woman to bear down, that the Head may ſucceed in the Place of the Shoulders, and not ſtop in the Paſſage.

When the Head ſtops in the Paſſage.

In this Caſe, put the Child's Thighs into the Hands of ſome one of the Aſſiſtants to draw gently, whilſt you by degrees diſengage the Head from the Bones of the Paſſage. To do this, ſlip one or two Fingers of your left Hand into the Child's Mouth, to diſengage the Chin, and with your right Hand embrace the hinder Part of its Neck above the Shoulders, and ſo draw it out above. This muſt be done as promptly as is poſſible, for fear the Child be ſuffocated.

If the ſtopping of the Child's Head in the Paſſage ariſe from its ill Poſition, turn the Face downward, ſliding the Flat of the Hand over its Face to cover its Inequalities, for the more eaſy turning and putting it into a more commodious Situation; but the Head and Body muſt be turned together, for fear in turning one without the other, the Child's Neck be twiſted round. After theſe Circumſtances obſerved, the After-birth muſt be fetch'd away as before.

How to fetch away the Child's Head when it is ſeparated from the Body, and remains behind in the Womb.

If the Head be ſmall and ſoft, as in Abortions, it may be eaſily drawn out; but if it

be big, the Artiſt muſt put his right Hand up into the Womb, and ſearch for the Mouth, and putting one of his Fingers into it, and his Thumb under the Chin, take hold of the lower Jaw, and draw it out.

But if the lower Jaw come off from the Head, he muſt draw his right Hand out of the Womb, and ſlip in his left, and with this ſtay the Head; and in his right, he muſt take a ſtraight ſtrong Hook or Crotchet with one Branch, and ſlide it all along the Inſide of his Hand, keeping the Point towards it, for fear of hurting the Womb. Having introduced it in this Manner, he muſt turn it to the Head, and ſtrike it into one of the Eyes, or Holes of the Ears or *Occiput*, or between the Sutures, and ſo bring away the Head, making way for it with his left Hand. When he has brought it near the Paſſage, he muſt withdraw his other Hand, which would be apt to hinder its coming away; however, he muſt leave two or three of his Fingers on the Side of the Head, to prevent the Womb's being wounded by the Inſtrument, if it happen to loſe its Hold.

If the Artiſt decline uſing the Crotchet, he may take a Fillet of ſoft Linen, three Quarters of an Ell long, and three Inches in Breadth, folded double; let him hold the two Ends with his left Hand, and the Middle with his right, being firſt anointed with freſh Butter; let him introduce the End of this Fillet into the Womb, and paſs the Middle over the Child's Head; then drawing the two Ends of the Fillet together, let him bring the Head out.

If theſe Means fail, the Artiſt muſt thruſt his left Hand into the Womb, and then ſlide in a crooked Knife with his right, with the Point turned toward his Hand, for fear of wounding the Womb. When it is in, he muſt turn it to the Head, and make an Inciſion in that to evacuate the Brain, and leſſen its Bigneſs. The Knife muſt be thruſt in with the left Hand, to prevent hurting the Head, and muſt be ſmall with a long Handle. If the Burthen be looſen'd from the Womb, it muſt be brought away firſt of all; on the contrary, if it adheres firmly, the Head muſt firſt be drawn forth.

When the Child's Head thruſts the Neck of the Womb out before it.

When this Accident happens, the Woman muſt not be obliged to walk or ſtand up but muſt be kept in her Bed with her Body lying even, and not ſo much raiſed as in natural Labour. You muſt omit giving ſharp Clyſters, and all ſuch Things as may moiſten and relax the Womb; and when the Child thruſts forward, the Artiſt muſt have one Hand on the Side of the Head, to put back the Womb to its proper Place, continuing to do this till the Child be born without drawing the Head as in natural Births. But if the Child be ſtop'd in the Paſſage, and be in Danger of being ſuffocated, he muſt draw it gently out by the Head, whilſt ſome other Perſon thruſts back the Womb with his Hands; and when this is done, he muſt fetch away the *Placenta*.

When the Child's Head comes firſt, and cannot come forth, becauſe it is too big, or the Paſſage not ſufficiently dilated.

In this Caſe, the bearing Part muſt be fomented and relaxed by Oils and Emollient Greaſes, and all Endeavours uſed to bring the Child into the World. If theſe prove uſeleſs, and it be certain that the Child is dead, the Artiſt muſt no longer ſcruple to fix his Crotchet into the Head, and ſo bring it out. Before this be done, let him introduce a Catheter well oiled into the Bladder to evacuate it, putting the Child's Head a little aſide, for the more eaſy ſlipping it in. After this, let him ſlide the Flat of his right Hand into the Entry of the Womb to the Side of the Child's Head, and with the left let him introduce a Crotchet, which ought to be ſhort and ſtrong, and in entring muſt be turned to the Inſide of the right Hand. After it is in, let him turn it and ſtrike it into the Middle of the Parietal Bone, and draw it gently till it has taken faſt hold; then let him take out his right Hand, and introducing his left Hand to guide it, fetch it out with the Inſtrument. If there be Occaſion, the Artiſt may uſe another Crotchet to the oppoſite Side of the Head

Head, to draw the whole more equally. In the last Place, (drawing out his Instruments) let him take hold of the Head with both his Hands, to bring out the rest of the Child's Body.

When the Child presents the side of the Head or the Face to the Birth.

To prevent the Child's advancing farther in this Vicious Posture; let the Woman lie down, and cause her to lean a little on the opposite side, to the Child's ill Position, then let the Artist slide up his Hand to the side of the Child's Head, to bring it Right. If this do not succeed, he must put his Hand up to its Shoulders, that so thrusting them back a little into the Womb, he may give it a Natural and Convenient Situation, after which he may proceed to deliver the Woman in the usual Manner.

If this succeed not, let him search for the Feet, and bring them out first.

When the Child's Head is Born, and the Body stopt in the Passage by the Shoulders.

Draw the Child's Head gently, sometimes by the Sides, sometimes taking it with one Hand under the Chin, and with the other on the Top of the hinder part of the Head, alternately drawing one side and the other to facilitate the Birth. If the Shoulders cannot pass, slide one or two Fingers of each Hand under the Armpits, and so draw out the Child. If it be stopt by a Hydropick Belly, introduce the Left Hand into the Womb, quite to the right sight of the Belly, and pierce that with a Crotchet, (for the introducing which, you may make use of your Right Hand) and when the Waters are let out, bring away the Child.

When the Child comes with one or both Hands together with the Head.

As soon as this ill Position of the Child is perceived, it must be prevented from proceeding farther. The Woman must be placed on her Bed, with her Hipps raised a little higher than her Head, and the Artist must put back the Child's Hand, guiding it as much as may be, to give way to the Child's Head, which having done, if the Child's Head be on one side, it must be reduced to its Natural Posture in the middle of the Passage, and so brought away as in ordinary Births.

When the Child presents one or both Hands foremost.

The Hand or Arm must be thrust as speedily as may be into the Womb, and the Artist must introduce his Hand under the Child's Breast and Belly, so far, till he finds the Feet, which he must gently pull towards him to turn it, and draw it forth, observing to do this with as little Violence as may be.

In introducing the Hand into the Womb, observe to slide it within the Membranes, that so it may turn more easily without hurting the Womb.

If the Arm come too far out, and cannot be put in without great Difficulty, by reason of its Bigness, and it be certain the Child is Dead, it is then advisable to take it off as high as is possible, beginning with an Incision around it, and cutting through the Bone with sharp Pinchers, as is practised by *Ambrose Parrè*. But I think it better to twist it once or twice round; for by this means it will easily separate from the Body in the Articulation, and there will be no danger of hurting the Womb by the Asperities of the Bone.

When the Child presents Feet and Hands together.

When the Womb is sufficiently Dilated, let the Artist slide his Hand into it far enough to reach the Child's Head, and put back that together with the Hands, to the bottom of the Womb, leaving the Feet in the same place where he found them, to draw the Child forth by.

Observe that whenever the Child, or any part of it, is to be thrust back into the Womb, the Woman must have her Hipps raised.

When the Child presents with the Knees first.

It must not be suffered to advance far in this Posture, wherefore having placed the Woman aright, put back the Child's Knees,

and to unfold its Legs, put one or two of your Fingers under the Ham, directing them by little and little all along behind the Leg, until you reach the Foot, that ſo having diſengaged one, you may do the ſame to the other, proceeding in the ſame Manner as with the firſt; after which, having brought both together, deliver the Woman in the ſame Manner, as when the Feet preſent firſt, obſerving to bring the Face of it downward, and ſuch Circumſtances as are noted where we treat of that Labour.

When the Child comes with the Shoulder, Back or Breech.

The Artiſt muſt thruſt the Shoulder a little back, that ſo he may have the more liberty of introducing his Hand into the Womb, then ſliding it along the Child's Body, on the Belly or Side, as he finds it eaſieſt, and ſearching for the Feet, he muſt turn it and bring them to the Paſſage, and ſo deliver the Woman.

If the Back preſent, he muſt ſlide his Hands along it towards the lower part, till he finds the Feet, and then draw it forth, as if it preſented with the Feet firſt.

If the Child come with the Breech firſt, he muſt gently thruſt it back, and ſliding up his Hand along the Thighs to the Legs and Feet of the Child, he muſt bring them gently one after the other forth of the Womb, by folding, ſtretching, turning and drawing them gently towards the ſide on which it comes eaſieſt, being careful not to wind them too much, or cauſe a Diſlocation, and then let him draw forth the reſt of the Body, as if it came with the Feet foremoſt.

If the Child's Buttocks happen to be ſo far engaged in the Paſſages, that it is impoſſible to thruſt it back, the Artiſt muſt draw it out in this Situation, by ſliding one or two Fingers of each Hand on each ſide of the Buttocks to make this way to the Groin, with as little Violence as may be, and then having crooked them inwards, let him draw the Breech juſt out to the Thighs, and ſo by drawing and wagging from ſide to ſide, he will diſingage them from the Paſſage, as alſo the Legs and Feet one after another, (being careful not to Diſlocate any part) and then he may extract the reſt as before, coming with the Feet.

When the Child preſents Belly, Breaſt or Side

When the Child preſents the Breaſt Belly, let the Artiſt ſlide gently the flat his Hand (being firſt well anointed) wards the middle of the Child's Breaſt, a thruſt that back to turn it, then let him ſl up his Hand under the Belly till he fin the Feet, and bring them to the Paſſage draw it forth, obſerving always to turn ſo that the Breaſt and Face may come dow wards.

When the Child preſents the Side, t Artiſt muſt thruſt back the Body of t Child, and introduce his Hand into t Womb, ſliding it along the Thighs till has found the Legs and Feet, and then tu it and draw it forth.

If ſeveral Children preſent to the Paſſa together, the Artiſt muſt carefully he which Member belongs to each Child, f fear he draw them both at once; if two three Feet come forth, let him take two, v one Right and one Left, and ſlide his Ha along the Legs and Thighs up to the Twi if forwards, or to the Buttocks, if bac wards, to find if they belong to the ſa Body, and when he is certain of this, him thruſt back the Foot of the other, to f cilitate the Paſſage, and draw forth the nea eſt, obſerving the ſame Circumſtances when the Child preſents with the Feet fir remembring likewiſe not to fetch away t Burthen, till the ſecond Child be Bor for ſometimes there is but one common *Pl centa* to both Children, which being ſep rated from the Womb, would cauſe a gre Flooding, and be apt to incommode the perator, nor can any remedy avail to r move this, till the Woman be delivered both her Children.

When one Child is come away, the Arti muſt tie the Navel-ſtring and cut it, and a ter that is done, bring away the other Chi by the Feet, and fetch away the Burthen in a Natural Delivery.

If the Child preſent any other part beſid the Feet, the ſame Method muſt be uſe

hich is above directed in each different Situation, obſerving to draw forth that which farthelt advanced in the Paſſage.

When the firſt Child is come away, and e Waters of the ſecond are not broken, e Membranes muſt be torn with the ingers to let them out, becauſe the Paſſage eing dilated by the Birth of the Firſt, the econd will come away without any diffiulty.

When the Navel-ſtring comes firſt.

Let the Woman be laid very warm in her ed, and the String replaced in the Womb s ſoon as is poſſible, to prevent its cooling. he Artiſt muſt endeavour to put it back ehind the Child's Head, and keep it there ith his Fingers till the Head be fully come orth, which will hinder the coming down f it again.

If it be neceſſary to draw the Hand out of e Womb before the Head be paſt, let him ut a very fine Rag between the Head and he ſide of the Womb, to ſtop the place here the Navel-ſtring paſſed, leaving one nd of the Rag without, to draw it out hen he pleaſes; and let a Compreſs dipt n Wine well warm'd be applied externally o the Womb, to defend the Navel from the injuries of the external Air.

But if the String yet come forth upon every Pain, then without further delay let he Artiſt bring the Child away by the Feet, which he muſt ſearch for, though it ſhould come with its Head; and let him gently hruſt that back, provided it be not too far dvanced; for in this Caſe it cannot be done ithout great Violence, Pain and Hazard f the Womans Life.

To ſearch for the Feet, let him ſlide his Hand on the Child's Breaſt and Belly, and hen he has found them, turn the Child nd draw it out.

When the Burthen preſents firſt, or is come away before the Child.

When the *Placenta* preſents firſt, nothing can be felt but a ſoft Body; there is a Flooding and concreted Blood comes away, and he Woman Faints.

When this happens, the Woman muſt be delivered with all Expedition, and if the Membranes are not broken, the Artiſt muſt put a little on one ſide that part of the Burthen which preſents, and break the Membranes with his Fingers, and let out the Waters, and turn the Child at the ſame time, if it be in any other Poſture than with the Feet foremoſt, and draw it forth immediately.

But if the Burthen be almoſt come forth, and the Membranes broke, he muſt bring away the *Placenta* before the Child, not amuſing himſelf with tying and cutting the String before he draws out the Child, to prevent loſing one moment of time in delivering the Woman, becauſe the Infant is in great danger of loſing its Life, and the Mother has a continual Flooding.

When there is great Floodings and Convulſions in Labour.

The beſt Remedy in this caſe, is to deliver the Woman immediately, without the leaſt Delay, fetching away the Child by the Feet; if the Flux of Blood be very Moderate, and nothing elſe requires it, you muſt not forward the Labour, and the Woman may go out her Natural Term.

If the Membranes are not broke when the Flooding appears, they muſt be torn as ſoon as the Womb is a little Dilated, becauſe the Burthen is fixed to thoſe Membranes, and theſe being extreamly agitated and moved by the Pains of the Mother, the *Placenta* muſt conſequently be moved, and a Flux of Blood enſue. If a Concluſion happen, the Woman muſt be delivered immediately. This is the beſt expedient in this Caſe, for the ſaving the Lives of both Mother and Child, if the Womb be open; but if it be not, then let the Artiſt have recourſe to the uſual Remedies; for inſtance, Bleeding in the Arm or Foot (if the Accident ariſe from Repletion) giving ſneezing Medicines or Clyſters to cauſe Throes and dilate the Womb, in the mean while humecting it with Emollient Fomentations.

To deliver the Woman, let the Waters be broke, and the Child drawn out by the Feet, unleſs its Head be engaged in the Paſſage, and then fetch it by that. If the Child be certainly

certainly Dead, let it be drawn out with the Crotchets, as was before directed.

When the Child is Hydropical or Monſtrous.

If the Dropſie be in the Head, let the Artiſt gently introduce his Left-Hand, on the right ſide of the Child's Head, which he will perceive to be very Big, and the Sutures ſeparate from each other; when he finds this, let him with his Right-Hand ſlide a crooked Knife all along the inſide of his Hand, with the point turned towards his Hand, for fear of hurting the Womb, and having conveyed it very near the Head to the place of the Sutures, turn it in that place, and make a ſufficient Aperture to let out the Waters, and draw forth the Child. The ſame Method may be uſed to let the Water out of other tumefied Parts.

But if the Child be of any Monſtrous Figure, or too big, or two grow together, they muſt be diſmember'd, without which it is impoſſible to fetch them out of the Womb. To perform this, let the Artiſt introduce his Left-Hand into the Womb, and conveying in the crooked Knife to the Parts he intends to ſeparate, let him cut them off, as near the Joynt as poſſible. If two Bodies are joyned together, let him ſeparate them in the place of their Coheſion, and draw out one after the other by the Feet.

When the Infant is dead in the Womb.

Give ſtrong Clyſters to the Woman to excite her Throes, and then deliver her as ſoon as is poſſible. In order to this, evacuate the Bladder of its Urine, and if the Child preſent with its Head firſt, thruſt it back, and introduce the Hand into the Womb, ſliding it under the Child's Belly, and ſearch for the Feet, and turning it by them, draw it forth, as we have ſo often directed. But here the Artiſt muſt have an eſpecial care that the Head do not remain behind, becauſe the Child is moſt commonly Rotten; and when this happens, it muſt be drawn out in the manner above directed.

If the Head be too far advanced in the Paſſage, it may not be thruſt back for fear of doing Violence to the Womb, but the Child muſt be drawn forth fixing Crotchets in his Head, and proceed after the manner we h elſewhere deſcribed.

If the Dead Child preſent an Arm, br it away from the Body by twiſting it o or twice round, and do the ſame in ot parts of the Body; and after the Chil thus brought away, collect all the part the Body, and compare them to ſee if a be Miſſing. Obſerve here to avoid uſ Crotchets, though you are certain the Ch is Dead, if it can poſſibly be brought aw by any other means; becauſe the Aſſiſta and Midwives are moſt commonly very C ſorious in this Caſe, and will not fail to i pute the Child's Death to the Artiſt.

Of a Mole and Falſe Conception.

A Mole is a Maſs of Fleſh without Bon Joynts or Diſtinction of Members, or a regular or certain Figure, Moles have Burthen or Navel-ſtring, but adhere to Womb, and draw Nouriſhment from and are ſometimes contained in Membran If Women caſt them before the ſecond third Month, they are commonly cal falſe Conceptions, and Moles if they are tained in the Womb for a longer time, a grow larger.

There is little difference in the Signs, enable us to diſtinguiſh between a Mole a falſe Conception; except that the Belly Women, who have Moles, is harder a more painful, and appears equally extend on all Sides, not riſing to a point befo and tumefies ſooner than if ſhe were rea with Child. Moles are void of Life and M tion, are not encompaſt with Waters, a attended with more Inconveniences, than Natural Conception, and the Woman h no Milk in her Breaſt, tho' ſhe can pr ſome Seroſities out of them.

When you are aſſured the Big-belly d only proceed from a Mole, try to bring it way as ſoon as is poſſible, giving the Pa ent ſome Purgative Medicines, in caſe the be no Fever or Flooding; and when the begin to Operate, give a ſharp Clyſter excite her Throes, and when the Womb b gins to dilate, relax it with Greaſe and mollient Oils. Bleeding in the Feet, a half Baths are very ſerviceable in this Ca

If a Mole be not too large, or adhere too firmly to the Womb, it will come away without the Aſſiſtance of any Remedies; but if it cleave ſtrongly, or be exceeding Large, when the Womb is ſufficiently dilated, the Artiſt muſt ſlide in his Hand and fetch it out, or make uſe of a Crotchet, or ſometimes a Knife, to divide it into Pieces.

If the Mole cleave to the Womb, he muſt ſeparate it from the part with his Fingers, which he muſt by degrees inſinuate between them, beginning in that place where it adheres leaſt, and proceeding till it be entirely looſned, having great care to have his Nails paired cloſe, for fear of hurting the Womb.

If it be a Falſe Conception, ſlide one Finger into the Womb, and bend it on one ſide and another, till you can enter a Second and a Third, or a Fourth, and then taking it between the Fingers, fetch it away together with the concreted Blood; and if no Portion happen to remain behind, the Flux of Blood will ſoon ceaſe. But if the Orifice be ſo ſmall, that the Artiſt cannot poſſibly introduce more than one Finger, let that be the Forefinger of the Right Hand, and let him thruſt that as far as he can, and turn it about to looſen the falſe Conception from the Womb, and bring it away with the Finger; and if he cannot do this, let him make Injections into the Womb to ſuppurate it. The Flooding will undoubtedly ceaſe, if no part of the Conception be left behind: But if the Internal Orifice cannot be more Dilated than is mentioned, and the Flooding be ſo violent as to endanger the Womans Life, the Artiſt having introduced the Fore-finger of his Left-Hand, muſt take with his Right a Cranes Bill or *Forceps*, and ſliding this along his Fore-finger, extract the Unnatural Body in the Womb, taking care not to pinch the Womb it ſelf, which he may prevent by guiding the Inſtrument with his Finger.

What is fit to be done to a Woman newly laid, and her Child.

THE DRESSING OF THE MOTHER.

When a Woman is Delivered, lay to her Privities a Cloſure of Linnen ſix or ſeven times doubled, to prevent the cold Air from entring her Body, which would ſhut the Veſſels, ſtop her Cleanſings, and create bad Accidents; as Fevers, Pleuriſies, Inflammations, *&c.* Let her Bed be well warmed and covered with Clothes ſeveral times doubled, which muſt be changed upon account of her Cleanſings, but firſt thoſe muſt be removed, which received the Child in her Labour. As for her Poſture, place her in her Bed with her Head and Body a little raiſed, to give way for her cleanſing and free breathing, and let her pull down her Legs and Thighs cloſe by one another, with a little Pillow under her Hams; and let her lie on her Back, that ſo the Womb may reſume its Natural Situation. After the Cloſure is removed, let an Anodyne Cataplaſm be applied, made of two Ounces of *Oyl of Sweet Almonds*, with the *Whites* and *Yelks of two New-laid Eggs*, beat and ſtirred together with a Spoon over ſome warm Embers, till it be of a due Conſiſtence. Let this Cataplaſm be applied hot, and continued on for the ſpace of three or four Hours, renewing it if there be occaſion; it appeaſes pain in the bearing part after Labour.

In the next place make a Decoction of *Barley*, *Linſeed*, *Chervil*, *Marſh-mallows*, and *Violet-leaves*, and with this foment the part three or four times a Day, for the ſpace of five or ſix Days together, to cleanſe the Privities from Clods of Blood, and other Filth which proceed from the Cleanſings.

Nurſe-keepers lay a Compreſs of a Triangular Figure, four or five times double on the Belly, to bear up the Womb as they pretend, and two others rolled up on each ſide, to keep it directly in the middle; then lay a ſquare Napkin all over the Belly, and after that Swathe it with another Napkin three or four times double, and about a quarter of an Ell broad. But the Belly ought by no means to be compreſt for the firſt fifteen Days, and if it happen to be ſo, the Bandage muſt be removed, to anoint it well with *Oyl of Sweet Almonds*, but after that time it may be a little ſtreightned, to contract and keep the parts together.

If the New-laid Woman intend to Suckle her Child, lay a ſoft and fine Cloth on her Breaſts to keep them warm, and prevent the Milk from Curdling. If the Milk begin to come too plentifully into them, embro-

cate

cate them with a mixture of *Oyl of Roſes* and *Vinegar*, and lay on them a fine Compreſs dipt in it.

After the Cleanſings are finiſhed, ſtrengthen the Womb with a Decoction of *Provence Roſes*, and *Roots and Leaves of Plantain* in *Smiths Water*. After that uſe this aſtringent Lotion to cloſe the Parts. ℞ *Pomgranate Peel, Cypreſs Nuts*, à ℥iß *Seal'd Earth*, ℥ß. *Provence Roſes*, ℥i. *Roch Alum*, ʒij. Infuſe theſe Ingredients for the ſpace of a Night in five half pints of Claret alone, or diluted with *Smiths Water*, (leſt the Wine alone be too ſharp) boil all till it be reduced to a Pint, then ſtrain it, and expreſs it ſtrongly, and with this foment the Parts well Night and Morning.

THE DRESSING OF THE CHILD. Put the Child into a warm Blanket, and take a brown Thread four or five times doubled, of a quarter of an Ell long, with a knot at each end to prevent its entangling. This Thread and a pair of Sciſſars, muſt ever be in readineſs againſt the time of Labour; then tie the Navel-ſtring with this Thread about a Fingers breadth from the Belly, and make a double knot, then turning the Thread round the Navel, make two other knots on the oppoſite ſide, and ſo cut the ſtring about a Finger's breadth more beyond the Ligature towards the *Placenta*. The Ligature muſt be ſo cloſe that no drop of Blood may paſs it, but not ſo ſtrait as to cut the Navel.

The end of the Navel muſt be wrapt round with a ſmall Rag, dry or dipt in *Oyl of Roſes*, and another doubled Rag laid on the Belly on the upper ſide, to repoſe the Navel on with a Compreſs over this, and theſe leſſer Dreſſings kept on with a Swathe of three Inches broad, roll'd round the Body. The Navel-ſtring dries and ſeparates near the Belly, within five or ſix Days or thereabouts.

Let the Child's Body be cleanſed with *Wine* and *Warm Water*, eſpecially the Head, Groin and Armpits, and wiped with ſoft Rags, or a Spunge dipt in *Wine* Lukewarm, or if the Excrements be very tenacious, in *Oyl of ſweet Almonds*. Let the Noſtrils and Ears be unſtopt with little Tents, and the Eyes wiped with a ſoft dry Rag.

When the Child's Body is cleanſed fr all the adhering Filth, view it well to if no part be diſlocated, and all the P ges be open for the voiding its Excremen and if they do not come away, give him the Mouth ſome *Syrup* of *Violets* or *Roſes*

After the Child is cleanſed, cover Head with a little Linen Biggen, wit Wollen Cap over that, but obſerve firſt place a Compreſs on the openneſs of the tures, and pin it without. Behind the put Rags to dry the Filth, and then la ther Rags on the Breaſt, and in the Fold the Arinpits and Groin, and ſo Swathe hi his Linen and Blankets well warmed, b ing him lightly on his Breaſt and Stom The Arms and Legs muſt be wrapt in Blanket, and kept ſtreight lying by eac ther, with a little of the Blanket betw to prevent them from Galling, by rubb againſt each other, and the Head muſt kept ſteady with a ſtay faſtned on each the Blanket.

How a Woman ought to govern her ſelf du her being with Child.

The Air in which ſhe breaths muſt Temperate, and if it be not ſo by Nat it muſt be reduced to due temper by warming if it be too cold, or cooling too hot.

A Pregnant Woman ought to ſhun warm an Air, becauſe it weakens and en bles the Body; on the other Hand, ſhe with equal Care avoid an Air which is and Foggy, which may cauſe Rheums Coughs, which putting her Body into Agitation, may make a Concuſſion of Womb, and cauſe an Abortion. She o not to live in ſtrait narrow Lanes or A or near Common-Sewers, or other ſtin Places, becauſe ill Scents will make her a Miſcarry. She muſt avoid the noxious Fu of Charcoal, eſpecially when not burn a Chimney, and alſo all Perfumes an ther ſweet Scents, eſpecially if ſhe be ſterical.

If a Pregnant Woman has a longing odd Things, ſhe muſt be indulged, th perhaps the things ſhe deſires are Impr provided ſhe eat Moderately. But i have no extravagant Appetite, let her

any ſort of wholſome Meats, in ſuch quantity as may ſuffice for the Nouriſhing her Self and Child, in which her Appetite is to be a Rule. Faſting, or long Abſtinence, is Hurtful, becauſe it heats the Blood, and conveys ill Nouriſhment to the Child, which renders it Weak, and Decay'd, and often makes it ſtruggle to free it ſelf before it's Time, and ſeek for better Food. On the contrary, ſhe muſt not eat too great Quantity of Meat, eſpecially at Night, becauſe the Womb in the laſt Months of going with Child, poſſeſſes a great part of the Capacity of the lower Belly, and hinders the Stomach from retaining much; and hence, when it is over-charged, it cauſes Belches, Indigeſtion, and difficulty of Breathing, proceeding from a Compreſſion of the Diaphragm, which wants Liberty of Motion. Let her therefore eat little, and often, and let her Bread be of the beſt Wheat, White, and well Baked, and not Brown Bread, or Baked Cruſt, which ſwells in the Stomach. Let her eat good Nouriſhing Meats, as the moſt Tender Pieces of Beef, Veal, Mutton, Lamb, Fowl, as Pullets and Fat Capons, or Partridge, Pigeons Boiled or Roaſted, as ſhe deſires; New-laid Eggs are very good, and Pregnant Women ſeldom having good Blood, ought to put into their Broth ſuch Herbs as purifie it, as *Sorrel*, *Lettuce*, *Succory* and *Borrage*. A Woman with Child ought not to eat no High Seaſoned Pies, eſpecially the Cruſt which is difficult to Digeſt; and if ſhe eat Fiſh, it ought to be Freſh, and not Salted, and ſuch as is bred in Rivers, and Running Waters, becauſe Pond-fiſh uſually taſtes of Mud, and breeds ill Juices. She may drink at Meals a little good Old Wine diluted with Water. Red Wine is better than White, and ſtrengthens the Stomach, helping Digeſtion, which is always bad in the time of Pregnancy. If ſhe was not uſed to it before, ſhe muſt gradually accuſtom her ſelf to it, but muſt never have it cool'd with Ice, or any otherwiſe drink it too Cold, for cool Liquors are apt to breed the Cholick, and by conſequence endanger Abortion. On the contrary, ſhe muſt no leſs carefully avoid what is heating, ſuch as all Salt, Sharp, Bitter, Aperitive and Diuretick things, which provoking the Courſes, are apt to make a Woman Miſcarry.

Women with Child are apt to have a ſharpneſs of Stomach, to prevent which they muſt refrain eating of Fruits, Sallets, Sugar, and drinking of Wine, which extreamly ſowers all their Aliment, and laſtly keep their Bodies Soluble.

Women with Child muſt have Moderate Sleep, that is Eight Hours at leaſt, and Ten at the moſt in the Night-time, and little or none at the Day-time. However, Women who are uſed to ſleep in the Day-time, muſt be indulged in this bad Cuſtom, rather than do violence to Nature, in breaking an ill habit too Abruptly.

As for Exerciſe and Reſt, theſe differ according to the times of Pregnancy. For the firſt four or five Days after Conception, a Woman ought to keep her ſelf in Bed, and decline the Embraces of her Husband. During all the remaining time of her going with Child, ſhe muſt uſe no violent Exercerciſe, muſt not go in any Coach, Chariot, or on Horſe-back, becauſe theſe Agitations of the Body are apt to looſen the *Fœtus*, and if ſhe have occaſion to go Abroad, it muſt be in a Chair or Litter. She muſt not carry any great Burthen, or lift her Arm too High; and for this Reaſon ſhe ought not to dreſs her own Head. The lifting of the Hands has cauſed many Abortions, becauſe the Ligaments of the Womb are relaxed by theſe violent Extenſions. Her Shoes ought to be Low-heeld, becauſe the Riſing of her Belly hindering her from ſeeing her Feet, ſhe is apt to Fall.

If a Woman happens to Stumble, fall or hurt her Belly by any other Accident, and ſhe find her ſelf to void Blood, or a bloody *Serum*, or indeed any Water from the Womb, let her Repoſe her ſelf ſome Days without ſeeing her Husband, till theſe Evacuations Ceaſe, and ſhe find no Pain in the Reins or Bladder.

In ſhort, ſhe muſt govern her ſelf ſo in all Exerciſes, as to exceed in too much Reſt, rather than Motion, becauſe a much greater danger attends the one than the other; and when ever a Woman is adviſed to uſe Exerciſe to facilitate her Delivery, it muſt ever be underſtood to be very Moderate. A Woman with Child ought to abſtain from the Embraces of her Husband, the two laſt Months before her Term, becauſe in theſe

Careſſes, there is a great Agitation of the Body and Compreſſion of the Belly, which often occaſions a wrong Poſture of the Child. A Woman with Child ought to have a preſence of Mind, and to be prepared againſt all Surprizes which may happen, as Claps of Thunder, Firing of Cannon, and other ſudden Noiſes, which Reſolution is difficult to be obtained.

Women with Child are ſubject to a Conſtriction of the Belly, becauſe the *Fœtus* preſſes on the *Rectum*, and hinders a free diſcharge of the Excrements; beſides, there is uſually in Women with Child a certain Heat of the Bowels, which diſpoſes them to Coſtiveneſs. Let a Woman who is ſubject to this Inconvenience, eat *Boyl'd Apples*, *Stew'd Prunes*, *New Figs*, *Mulberries*, *Honey with Bread*, *Rye-Bread*, *Veal-Broth*, &c. and take a Clyſter of *Warm Water* frequently to humect and relax the Gut. Let her ſometimes take clean *Caſſia* ʒß. or Veal-Broth with the Emollient Herbs, and an Ounce of the beſt Honey. If theſe innocent Remedies are not ſufficient, give her Mild Clyſters, made of a Decoction of *Mallows*, *Marſh-mallows*, *Pellitory*, and *Aniſe-ſeeds*, with two Ounces of Brown Sugar diſſolv'd in it, adding a little *Oyl*, or a Decoction of *Bran*, adding *Honey of Roſes* with a piece of *Freſh Butter*, or any other thing as occaſion Requires. But here be cautious not to give ſharp Clyſters, or any thing which may excite a *Diarrhœa*, and cauſe too great an Evacuation, becauſe this will endanger an Abortion.

She muſt moderate her Paſſions, eſpecially Anger and Jealouſie; and care muſt be taken not to Surprize her with Fear, or the Relation of any Accident, which may affect her with extraordinary Grief. Theſe Paſſions put the Spirits into a Diſorder, and often cauſe Women to fall in Labour at that very Inſtant.

When a Woman finds or ſuſpects her ſelf to be with Child, ſhe muſt not, as that Sex uſually do's, wear Bodice with Whale-bone, for theſe hurt the Breaſts, and compreſs the Belly, and often cauſe the Children to come before their Time, and ſometimes Misſhapen. Theſe Nice Ladies out of Affectation of ſhewing a good Shape, ſpoil their Belly, which after they are Laid is full of Wrinkles, becauſe the Skin not having liberty to ex- tend it ſelf on all Sides, forces its way to- wards the Thighs, where being exceedingly ſtretched, it can never after regain its pri- ſtine State, but hangs down like a Purſe, and this Folly ſometimes cauſes them to have Ruptures. For this reaſon Big-bellied Wo- men muſt have their Clothes looſe without Buskins which compreſs the Belly, and the *Fœtus* in it. In the laſt place they muſt ne- ver bath for fear the Womb open, and an Abortion Enſue.

A Woman with Child if occaſion require may Bleed, but the Evacuation muſt be ſmall, and there is no Regard to be had to the Time, provided the quantity be not too Large.

Of Vomiting in Women with Child.

A Woman has commonly an inclination to Vomit in the beginning of her Pregnancy, and at ſuch times there is no great Apprehenſions; but if this continue it weakens the Stomach exceedingly, and it is more apt to Corrupt, than digeſt the Food. Theſe Vomitings continue till the third or fourth Month, which is the time the Child ſtirs moſt. After that time Women uſually be- gin to regain that Appetite which they had loſt the firſt Month, and this ſeems neceſ- ſary, becauſe the Child growing greater, re- quires a larger ſupply of Nouriſhment. Some- times the Vomiting perſiſts, and then the Woman is in great danger of Miſcarrying, becauſe theſe Commotions throw the *Fœtus* lodged in the Womb downwards. Some Women are more afflicted with this Acci- dent in the latter Months, than in the firſt, becauſe the Stomach is compreſſed by the di- ſtention of the Womb. This Vomiting when it happens to Women, whoſe Chil- dren lie High, do's not ceaſe till their Deli- very

You need not be concerned if a Woman Vomits in her firſt going with Child, if this be not attended with any extraordinary Straining, but if it perſiſt after the fourth Month, ſome Remedy muſt be uſed; be- cauſe the *Fœtus* growing Large, requires Nouriſhment as well as the Mother, and muſt neceſſarily be deprived of it, if ſhe continues to caſt it up, beſides the Commo- tio

tion of the Body endangers an Abortion, or a Deſcent of the Womb.

This Vomiting cannot be ſtopt of a ſudden, but muſt be abated and checked by Degrees, by taking good Suſtenance, and eating but a little at a time, becauſe the Stomach being repell'd by the Womb, the Meat Regurgitates. To this end let the Patient make her Meat Palatable with *Juice of Oranges, Limons, Pomgranates*, or a little *Verjuice* or *Vinegar*, as her Appetite ſerves. She may take often a Decoction made of *Flower of Barley*, firſt baked a little in an Oven, and then mixed with *Yelks of Eggs*, to make it more Nouriſhing and eaſie of Digeſtion. She may likewiſe eat after her Meals, a little *Marmelade of Quinces*, or *Jelly of Goosberries*, and drink ſome old *Red Wine* mixt with *Spring Water*, or in want of that, clear *River Water with Iron quencht in it*. Let her refrain from all Fat Meats, which are apt to relax the Stomach, and excite Vomiting, and ſo do all things which are ſweet and prepared with Sugar. Let her give a grateful ſharpneſs to whatever ſhe Eats, for all ſharp things are Aſtringent, and preſerve the Tone of the Stomach. A Spoonful of *Aqua-vitæ*, or a Glaſs of Sack now and then, is very proper to take of *Nauſea's* and Vomiting.

If Vomitings continue after a Woman is gone half her Time, have Recourſe to Mild Purges, as *Sena*, ʒi. *Rhubarb*, ʒß. and *Syrup of Succory*, ʒi. This is a good Medicine to attenuate and carry off the Tenacious Humours lodged in the Stomach and Guts; or purge her with *Manna, Caſſia, Tamarinds*, and ſuch like Lenitives, never omitting a little *Rhubarb* and *Compound Syrup of Succory*. But a Woman under theſe Circumſtances, muſt never uſe violent Medicines, as *Antimony, Hellebore*, or *Scammony*, for fear of an Abortion.

If notwithſtanding the Woman continues to Vomit, it is beſt to leave the Cure to Nature, for fear of an Abortion, which will infallibly follow when ſhe is ſeized with the Hiccough.

Note, Here it is convenient to Bleed, in theſe Caſes before Purging, interpoſing ſome ſmall interval of time between theſe Evacutions, for fear of putting the Blood into too great a Commotion.

The Cold Air is a great Enemy to Women apt to Vomit, and therefore they ought to go warm Clad, and wear a Lamb's Skin on their Breaſt and Stomach.

Of Pains in the Back, Reins and Hipps of Big-bellied Women.

The Pains of theſe parts proceed from the Diſtention of the Ligaments of the Womb, which are inſerted in theſe Places. The beſt Remedy to appeaſe theſe Pains is Reſt, and a Big-bellied Woman who in ſtraining has diſtended theſe Ligaments, ought to loſe a little Blood in the Arm, and keep her Bed for ſometime. If the Pains ariſe from a bearing down of the Womb on the Lower Parts, the Woman muſt keep her Bed, or at leaſt her Belly muſt be ſuſpended with a large Swathe till the time of her Delivery.

If there be any extraordinary Excretions from the Womb mixt with Blood during theſe Pains, there is great danger of Abortion, and it ſhews the Womb begins to open. But to avoid being deceived in paſſing a Judgment in this Caſe, conſider well if there be a great Repletion of Blood, or the Woman be ſubject to the Gravel, both which are capable of producing this Accident; and if either of theſe appear to be the Cauſe, let proper Remedies be uſed, but with great Moderation.

Of Pains in the Breaſt.

When a Woman becomes Pregnant, her uſual Monthly evacuations ceaſing, and ſhe breeding ſtill new Blood, it flows to the Breaſts, and diſtending the Veſſels there creates great Pain. A Woman at this time muſt be exceeding careful not to hurt theſe parts which are extreamly Senſible. She muſt not go with her Bodice ſtrait Laced, for fear of a Contuſion, which may end in an Inflammation and Abſceſs. If the Pains of her Breaſts continue after the third Month, let her Bleed in the Arm, forbearing all Repellent and Reſtringent Medicines, let her uſe a cooling Diet, moderately Nouriſhing, and keep her Body Open.

Of Difficulty of Urine.

When the *Fœtus* compreſſes the upper Part of the Bladder, it neceſſitates a Woman to make Water every Moment; but if it compreſſes the Neck, as in the firſt Months after Conception, it intercepts its Paſſage. Sometimes the ſharp Salts of the Urine, pricking the Bladder, ſtimulate a Woman to make Water frequently, and inflame the Bladder, from whence a Suppreſſion of Urine enſues.

If a Woman with Child have a Stone in the Bladder, it is exceeding troubleſome, and the Womb preſſing the Bladder on it, creates inſupportable Pain, if the Stone be rugged and unequal.

There is a neceſſity to help this Accident as ſoon as is poſſible, becauſe the Woman's ſtraining to make Water, forces down the *Fœtus*, and haſtens the Birth. If it proceeds from a Compreſſion of the Bladder by the bigneſs and weight of the Womb, the Woman may in ſome meaſure help this by keeping up her Belly with both Hands when ſhe makes Water; or ſuſpending it with a Swathe, or which is beſt of all keep her Bed. If it proceeds from the Acrimony of the Urine, which inflames the Neck of the Bladder, it muſt be abated by a cool *Regimen*, and drinking a Ptiſan, refraining from Wine. She may uſe Emulſions Morning and Night made with the *Cold Seeds* in *Barley Water*, with a Spoonful or two of *Syrup of Violets*, or *Nymphæa*. If this do not abate the Inflammation, let her Bleed in the Arm, and foment all the External part of the Neck of the Bladder with warm Milk, or a Decoction of the emollient cooling Herbs, as *Mallows*, *Marſh-mallows*, *Pellitory*, *Violet Leaves*, with a little *Linſeed*; or inject the ſame into the Neck of the Bladder, adding to it a little *Oil of Violets* or *warm Milk*; the Woman in the mean time muſt refrain from Copulation.

If theſe Remedies prove ineffectual, hold up her Belly and introducing a *Catheter* (being firſt well Oiled) through the *Urethra* into the Bladder, by this means evacuate it, and if the Suppreſſion return, uſe the *Catheter* again, as long as occaſion ſhall Require. If this inconvenience continue, let her uſe the Half-Bath, having an eſpecial care that ſhe be not moved by it; all hot Diuretic endanger an Abortion, and therefore muſt ſhun the uſe of them.

If the Difficulty of Urine proceed from Stone of the Bladder, thruſt it back w the *Catheter* if it be large, but if it be ſm try to fetch it away with an Extracter, p ting the Forefinger into the *Vagina* to k it ſteddy, and hindering it from recoyli into the Bladder.

Of a Cough and Difficulty of Breathing.

Women whoſe Children lie high are ſubj to a Cough, becauſe the Womb bears up Diaphragm. A violent Cough is one of moſt dangerous Accidents which can b a Woman with Child, and muſt be careſ ly prevented by a regular and cooling Di avoiding all ſharp and high Seaſoned Mea If it ariſe from the ſharpneſs of the *Lymp* ſhe muſt refrain from all ſowre things, *Oranges*, *Lemmons*, *Pomgranates*, *Vineg Verjuice*, which are to irritate the Part, a excite a Cough. On the contrary, let h uſe all ſuch things as temper and ſweet the Blood, *Milk-meats*, *Decoction of Liquori Sugar-candy*, *Syrup of Violets* and *Mulberr* ſome Spoonfuls of which ſhe may mix wi her Ptiſan (made of *Jujubes*, *Sebeſten*, *R ſins of the Sun*, *French Barley*, with a lit *Liquorice*,) adding to all theſe a few C ſters. In the laſt place, if all theſe mea prove ineffectual, and there appear manif ſigns of Repletion, let her Bleed at whatſ ever time of her going with Child it be, moderate Bleeding can never be ſo dangero as a continual Cough.

If her Cough proceed from taking Co let her keep her ſelf warm in her Chamb and take ſome Spoonfuls of *Syrup of bu Wine*. To make this, ℞ the *beſt Wine* h a Pint, *Cinnamon groſly powder'd*, ʒii. *Clov n.* vi. *Sugar double Refined*, ℥iv. Put th together in a Silver Porringer, and boil th upon a Chafing-diſh to the conſiſtence of Syrup, of which let the Woman take Night, an Hour or two after a light Su per, or let her take a little good *Roſa So* It is requiſite the Woman have her Body pen, to which end ſhe muſt ſometimes ta Clyſters, have all her Drink warmed, ſpe little, and refrain from Copulation. If

wa

ant Sleep, that muſt be procured by Mild omniferous Juleps, and not by ſtrong Nerticks, which are dangerous in pregnant Women, and never to be uſed without preſng Neceſſity.

Some Women bear their Children ſo high, at they have not liberty to Breath, in this ſe Bleeding is neceſſary to diſcharge the ungs, and make room for their Expanſion. this difficulty of Breathing proceed from Compreſſion of the Diaphragm, the Woan muſt go looſe in her Dreſs; muſt eat ut little at a time and often; muſt refrain om all viſcous or windy Meats, as *Peaſe*, nly feeding on things eaſie of Digeſtion, nd Laxative; muſt ſhun all Melancholy pprehenſions, and ſadneſs of Mind; for eſe Paſſions are apt to divert the Blood, and etermin it to the Heart in ſo great a Quanty, as may endanger a Suffocation.

Of Varicoſe Swellings, and Pains in the Thighs and Legs.

In the laſt Months of a Woman's going ith Child, the Womb being very much ſtended, compreſſes by its weight the Iliac eins; by which the Refluent Blood is indred in its Aſcent, and the *Saphena* and rural Veins, together with all the Veſſels f the Legs and Thighs, are tumefied by its egurgitation, and the Blood it ſelf ſtagnaing, cauſes great Pains and Swellings. Theſe aricoſe Swellings only admit of a palliative ure during the time of Pregnancy, *viz.* by ying a compreſs of Rags, and binding on the tumefied Veſſels. Let the Roller ith which the Part is bound, be about two three Inches broad, and begin to apply below, aſcending to the *Varices*, which ing conſtringed by this Bondage, are inpable of farther Dilatation, and the Blood inder'd from ſtaying too long, and corruptg in them, whilſt at the ſame time it finds paſſage through the other Veſſels, and by onſequence the Circulation is not interceptd. Let the Woman during this keep her ed as long as ſhe can, becauſe the Blood ſcends to the Head more eaſily, whilſt the in this Poſture, than when ſtanding. If e *Varices* ariſe from Repletion, let her leed in the Arm. Bleeding in the *Varices* emſelves is condemned by Practitioners; as being an equivalent to Bleeding in the Foot, a thing never to be practiſed in Women with Child.

Some Women have only Oedematous Swellings (proceeding from abundance of ill Juices) which retain the impreſſion of the Finger. Theſe are to be cured by promoting Tranſpiration, by applying compreſſes dipt in Aromatick Tinctures, and repeated twice or thrice a Day; for inſtance, ℞ *Roſemary*, *Bays*, *Time*, *Marjoram*, *Sage* and *Lavender*, *Ana* one Handful; *Provence Roſes*, half a Handful; *Balauſtians Alum*, *Ana* ʒi. Boil all in three Pints of *Red Wine*, to the conſumption of one third, and then ſtrain it through a Linen Cloth, and keep it for uſe.

Of the Hæmorrhoids.

The *Hemorrhoids* in Women with Child, ariſe from the ſtopping of their Courſes, which conſtrains the Superfluous Blood to ſeek that way for its Diſcharge; oftentimes they proceed from great ſtraining in going to Stool, Big-bellied Women being for the moſt part bound.

If the Piles are ſmall and indolent, care muſt be taken (whether they be within or without the Body) to prevent their encreaſe by the uſe of Medicines, proper to hinder and prevent a Fluxion on the Parts, but if they are large and painful, the Pain muſt be appeaſed; for ſo long as that continues, the Fluxion neceſſarily increaſes. And therefore if there be an apparent Repletion, let the Woman Bleed to abate and divert the Plenitude, let her Diet be Regular, Moiſt and Cooling, let her abſtain from all high Seaſoned Meats; and refrain from the embraces of her Husband. If the Piles proceed from her being bound, and the Excrements are hardned in the *Rectum*, which frequently happens in Perſons who have been a long time without going to Stool, give her a Clyſter of Warm Water, or a Decoction of *Mallows*, *Marſh-mallows*, *Pellitory*, *Violet-leaves*, *Linſeed* with *Honey* and *Nenuphar*, mixing with it a little *Oil of ſweet Almonds*, and *Freſh Butter*, without any ſharp Ingredients which will not fail to exaſperate them, eſpecially when the Piles are inward. To paſs in the Pipe with leſs trouble in giving

the

the Clyſter, put the leſſer end of a Pullets Gut on it. Let her keep to a cooling Diet, and repoſe her ſelf on her Bed till the Fluxion ceaſe, and during this time foment the Piles with *Warm Milk* from the Cow, or Decoctions of *Marſh-mallows*, *Tapſus Barbatus*, and *Linſeed*. *Oil of Eggs* alone, or *Oyls of ſweet Almonds*, *Poppies* and *Nenuphar* beat up with the Yelk of an Egg, for a long time together in a Leaden Morter, are admirable to allay the Pain, and if the Inflammation be very great, a little of *Galen's Cerate*, mixed with an equal quantity of *Populeon*, may be put in. If the Piles do not go off, and the Swelling do's not abate after the uſe of theſe Remedies, open them with a Lancet if they are hard, or if they are ſoft apply Leeches, which will ſerve well enough, and create leſs Pain.

If the Piles diſcharge Blood in great quantity, the Life of the Mother and Child are both very much endangered; and therefore to prevent this Miſchief, foment well the part with a *Decoction of Balauſtians*, *Pomgranate Peels*, and *Provence Roſes* in *Smiths Water*, adding a little *Alum*; or apply a Cataplaſm made of *Bole Armoniack*, *Dragon's Blood*, *Terra Sigillata*, and the *White of an Egg*. Bleeding in the Arm likewiſe is very proper, to turn the Courſe of the Blood.

Of a Looſneſs in Women with Child.

Women with Child are ſubject to divers ſorts of Looſneſſes, all which are apt to make them Miſcarry, if they be Violent and laſt for any conſiderable time; but the worſt of this kind is a Dyſentery or Bloody Flux, becauſe this is accompanied with vehement and ſharp Pains in the Guts, which cauſe Throes and great Straining to go to Stool, which often brings the Birth before the due term is accompliſhed.

Timely care muſt be taken in theſe Fluxes of the Belly to prevent Abortion; and for this end their Nature muſt be conſidered; for inſtance, in a Lientery enſuing on continual Vomiting, which frequently happens, the Woman muſt abſtain from all ſorts of unuſual Food; muſt eat nothing but what is Nouriſhing, and eaſie of Digeſtion, and that in ſmall quantity too, that the Stomach may more eaſily concoct it; ſhe muſt drink a little Red Wine diluted with Water, in which Iron is firſt extinguiſhed, inſtead her Ptiſan which is not proper on this O ſion, unleſs ſhe have a high Fever (for cept it be high, ſhe need not refrain) an this caſe ſhe may take ſome good Cordia Reſtorative before and after Meals, a Spoonful or two of *Syrup of burnt Wi* little *Hippocras* or *Alicant*. She may be Meals eat a little *Conſerve* of *Roſes*, or *M melade of Quinces*, and wear a Lamb-ski her Stomach, to preſerve and ſtrengthen Natural Heat, which is neceſſary for D ſtion. She muſt not take any Purgative dicine, for theſe are apt to deſtroy the T of the Stomach, and diſable it from perfo ing its Office.

When the Flux is no more than a ſim gentle *Diarrhæa* of no long ſtanding, the Woman is not much incommoded endangered by it, it is ſufficient to mode it without ſtopping it all at once; but if Evacuation continues above four or five D the Tenacious Humours lodged in the G muſt be carryed off by ſome mild Purgat as an *Infuſion of Rhubarb* with *Syrup of Succ* or an Ounce of *Double Catholicon* with *Rhub*

But if the Looſeneſs continue notw ſtanding, and become a Dyſentery, and have conſtantly bloody Stools, great p in her Bowels, and a *Teneſmus*, ſhe is in ry great danger of Miſcarrying. The to prevent this Miſchief, is to purge with Medicines before mentioned, and prevent breeding of ill Humours in the Bowels b good Diet. To this end let her eat *Veal Chicken Broth*, with the cooling Herbs bo in it, with a *Quince* to allay the ſharpne the Humours; let her eat *Rice* boiled in Broth, or let ſome New-laid Eggs be bea in, becauſe theſe ſmoothen the inſide of Guts.

A Woman in this Condition may dr *Chalybeate Waters*, with a little *Wine* if have no Fever, or if ſhe have, ſhe may t a Spoonful of *Syrup of Quinces* or *Pomgra* in a Glaſs of Water, and eat a little *M melade of Quinces*, or *Conſerve of Roſes*, ſome other Reſtringent and Corroborat Things, after being well Purged. To ab the violent and ſharp Pains in the Belly *Rectum*, which ariſe from a diſcharge ſharp Humours on the Parts, and excite c tinual Throes endangering an Aborti

ive a Clyſter made of the *Decoction of a alve's or Sheep's Head*, adding to it two ounces of *Oil of Violets*, or of new Milk, with the *Yelks of two new-laid Eggs* beat with it; and give the Patient a little *Laudanum* in the Yelk of an Egg, to cauſe her to reſt quietly. When ſhe has retained theſe Anodyne Clyſters as long as ſhe can, next give her deterſive ones made of the *Decoction of Barley, Mallows* and *Marſhmallows*, with *Honey of Roſes*; and after theſe aſtringent ones, (without *Oil* or *Honey*, which are laxative) beginning with the weakeſt, as *Lettuce* or *Plantane Water*; and after giving ſtronger, made of a Decoction of the Leaves and Roots of *Plantane*, *Tapſus Barbatus*, *Horſe-tail*, *Provence Roſes*, and *Pomgranate Peel*, boiled in *Smith's Water*, adding *Terra ſigillata*, *Dragon's Blood*, equal Parts, two Drams; and with this foment the Fundament. Before the Uſe of theſe Reſtringents, the Woman muſt be purged with the Medicines above-mentioned, for fear of endangering the Life of both the Mother and Child, by Retention of Abundance of vicious Humours.

But ſince Dyſenterick Pains frequently proceed from a ſharp Humour lodged in the Stomach, and the Effect of Clyſters does not extend ſo high, it is convenient for the Patient to drink half a *Porringer of new Milk* twice or thrice a Day, and this Remedy has often relieved pregnant Women in Dyſenteries. But the Cow which gives this Milk muſt not be heated, have a groſs full Body, or have lately calved; but ought to be ſound, and fed upon a good Paſture well watered.

Of the Menſtruous Flux in Women with Child.

Sometimes Women have their Courſes for the firſt four, nay ſix Months. When a Woman voids Blood downwards, it muſt carefully be conſidered whence it proceeds, and in what Manner; whether it be the ordinary Courſes, or a real Flooding. If it be the Courſes, the Blood comes away at accuſtomed Times, and flows by Degrees from the Neck of the Womb, and not from its Bottom; as may be diſcovered, if (trying with a Finger) the internal Orifice be exactly cloſed, which could not be if the Blood come from the Bottom of the Womb; to all which add, if it be the Courſes, it will be ſmall in Quantity. Sometimes this Evacuation of Blood is not Menſtruous, and yet muſt not be thought a Flooding; for if the Woman be full of Blood, and the Abundance be greater than the *Fœtus* can conſume, this Evacuation is ſo far from being hurtful to the Mother or Child, that if the Womb was not diſcharged of that ſuperfluous Blood, the *Fœtus* would be ſuffocated by it. On this Occaſion, it is better to bleed moderately, than leave Nature to perform her Work.

If there be no viſible Repletion, and the Courſes continue after a Woman is with Child, it proceeds from an extreme Fluidity of the Blood, which, perſiſting during the whole Time of her going with Child, makes her ſubject to miſcarry; or if ſhe eſcape, her Child will be weak, tender and unhealthy. To prevent theſe Accidents, let her repoſe her ſelf in her Bed, refrain from all Meats which may heat the Blood, ſhun Anger, uſing a cooling Diet, and feeding upon Meats which breed good Blood and thicken it, ſuch as are good Broths made with Chickens, Necks of Mutton, or Knuckles of Veal, in which may be boiled cooling Pot-herbs, as *Purſlane*, *Lettuce*, *&c. New-laid Eggs* or *Jellies*, with *Rice* and *Barley* boiled in them, are good. She may drink Water in which Iron has been quenched, with a little *Syrup of Quinces*. She muſt refrain from Copulation, becauſe, by heating the Blood, it excites it to flow more. If all theſe Means are ineffectual, and the Flux continues, make a Revulſion by Bleeding in the Arm, if the Woman's Strength permit, and apply to the Mother's Belly Compreſſes dip'd in *ſtrong Wine*, in which a *Pomgranate*, with its Peel, *Provence Roſes*, and a little *Cinnamon*, have been boiled. But the beſt Way is to correct the Mother's Blood.

Of Flooding.

Floodings proceed from the Bottom of the Womb, with great Pain, and come of a ſudden; the Blood runs away in great Quantity without Intermiſſion, except when ſome Clods ſeem ſometimes to leſſen the Flux, or ſtop it for a Time; but ſoon after it returns with

with greater Violence, and kills both Mother and Child, unleſs timely prevented.

When this Flooding happens to a Woman who is young with Child, the Cauſe moſt commonly is ſome Mole or falſe Conception, which the Womb labours to expel, and in that Effort breaks the Blood-Veſſels. In Women who are really with Child, it proceeds from a looſening of the *Placenta*, whoſe Separation opens the Mouths of the Veſſels. This moſt commonly is occaſioned by ſome Blow, Slip or Hurt; though ſometimes it is cauſed by the Child twiſting himſelf in the Navel-ſtring, and ſo drawing the *Placenta* very ſtrongly. This Flooding never ceaſes till the Woman be deliver'd, and is more violent and dangerous in proportion to the Largeneſs of the *Fœtus*.

Every Evacuation of Blood does not require the Woman to be deliver'd immediately; for ſometimes the Loſs is very ſmall, and may be ſtop'd by keeping her quiet in her Bed, bleeding her, and confining her to a good Diet; and the Blood perhaps is only her Courſes, or proceeds from ſome Veſſel which opens it ſelf on the Outſide of the internal Orifice, and keeps the Womb from being exactly cloſed. In this Caſe, it is neceſſary to try whether the internal Orifice is open on the Inſide, or whether the Child can be felt acroſs the Membranes; for if ſo, it is a demonſtrative Proof it is a real Flooding, and the Woman will ſoon miſcarry.

If the Blood come away in ſmall Quantity, and the Evacuation do not laſt long, leave the delivering the Woman to Nature, provided ſhe have a competent Degree of Strength, and no dangerous Accidents happen. But if it come away in great Abundance, or the Woman have Swoonings or Convulſions, it is abſolutely neceſſary to deliver her at whatever Time it be, whether ſhe have the Pains of Labour or not, and there is no other Way to preſerve the Life of the Mother and Child. To this End, let the Artiſt place the Patient on her Back, and anointing his Hand with freſh Butter or Oil, by degrees inſinuate his Fingers cloſe together into the Womb, and ſpread them one from the other when they are in the Entry, and dilate it by degrees without Violence. When he has his Hand in the Womb, if he finds the Waters are not broke, let him tear the Membranes, and ſlip his Hand in a[s] fetch away the Child by the Feet, and a[fter] that bring away the After-burthen, wh[ich] does not adhere very firmly, taking care leave no Clods of Blood behind; for th[ey] will cauſe the Flooding to continue, wh[ich] otherwiſe would ſoon ceaſe.

Since in all great Loſſes of Blood, gr[eat] Weakneſs muſt neceſſarily follow, let t[he] Patient be ſtrengthen'd with good Broth[s] Jellies, or a little Wine; for liquid Alimen[ts] have a more prompt Effect than Solids. L[et] her ſmell to ſome ſpirituous Liquors, as *Ag[ua] Vitæ*, *Queen of Hungary's Water*; or lay *Toaſt ſteep'd in Wine*, in which *Cinnamon* h[as] been infuſed; or bleed her in the Arm, her Strength permit, and ſhe be not t[oo] much exhauſted; obſerving to cloſe the O[ri]fice from Time to Time, for the more ea[ſy] diverting the Current of the Blood, wit[h]out weakening her too much.

You may try to ſtop the Flux of Blo[od] by Napkins dip'd in *Oxycrate* made w[ith] *Plantane Water*, applied to the Small of t[he] Back: Or let the Patient lie on a Mat, a[nd] take two or three Ounces of *Juice of P[lan]flane*. If all theſe Remedies are ineffectu[al] deliver the Woman forthwith, though [ſhe] be not above three Months gone, leaving n[o] thing in the Womb; and this is the on[ly] Means to ſave her Life.

Of the Weight or Bearing down of the Wom[b]

The Weight and Bearing down of t[he] Womb hinders a big-bellied Woman in [her] walking, and cauſes a Stupor of the H[ips] and Thighs, Pains in the Groin, a Difficu[l]ty of making Water, and diſcharging t[he] Excrements in the Guts, (becauſe it co[m]preſſes the Bladder and *Rectum*, and dra[ws] down the Ligaments) all which Accide[nts] are capable of making a Woman miſcar[ry]. The beſt Remedy in this Caſe is to keep [her] lying a-bed; but if ſhe be not in a Con[di]tion to do this, let her ſupport her Be[lly] with a large Swathe, to eaſe the Ligamen[ts] which are very much ſtrained; and wh[en] ſhe makes Water, let her hold up her Be[lly] with both Hands, to keep it from preſſ[ing] on the *Sphincter*.

If the Neck of the Womb be too mu[ch] relaxed by the Humidities, let her purg[e] co

convenient Times, and uſe a dry Diet, feeding much on Roaſted Meats. Let her not go ſtrait-laced, for fear of compreſſing the Womb which bears down too much already.

Of a Dropſie of the Womb.

The Womb is ſometimes ſwoln and diſtended with Water, which is apt to impoſe on Midwives, who miſtake this Diſtemper for a Womans being with Child.

Sometimes theſe Waters are inclos'd in a Cover, and ſometimes they are in the Cavity of the Womb. When they have no Cover, they are often miſtaken for a true Big-belly, and this Errour remains till the uſual Term is compleated. The longer any Woman retains theſe Waters, the more ſhe runs a riſque of her Life, and ſometimes they grow to ſo vaſt a Bulk, that ſome have been found with 30 ℔ in their Womb.

To diſtinguiſh between this Hydropical Swelling, and a true Great Belly, conſider well the Signs of Pregnancy which are delivered above, that having nothing common with this, except a Diſtention of the Belly, and a Suppreſſion of the Courſes. In a Dropſie the Woman has her Breaſts flaggy, ſoft and fallen, has no Milk in them, do's not feel the Child ſtir, perceiving only a Fluctuation of the Water, has a great Pain and Weight in the Belly, which is more extended in its Circumference, and do's not riſe to a Point, and the colour of her Face is worſe, than when with Child. Barren Women are more ſubject to this Indiſpoſition, than thoſe who have had Children; and theſe have the Inner Orifice of the Womb, ſtraiter and thinner than the other.

Dropſies of the Womb ſometimes happen in Women who are with Child, and in theſe caſes the Waters are without the Membranes which contain the Child. Sometimes too they are incloſed within the Membranes, and the Woman ſeems to be big with two or three Children, though ſhe really have but one, and that very weak too. Sometimes abundance of theſe Waters come away two or three Months before Labour, and in this caſe it is certain they are without the Membranes, for if the Waters were broke, the Child of neceſſity muſt needs follow.

When this Dropſie happens to a Pregnant Woman, all the Relief ſhe can have is the Patient expecting her time of Labour, and in the mean time uſing a drying Diet. But if there be nothing beſides Waters contained in the Womb, let her uſe a Half-bath, Diuretick Medicines, and all ſuch things as provoke the Courſes, to evacuate them. Farther, let her Bleed in the Foot, and purge with ſtrong Hydragogues. The *Bourbon* Waters are very good, eſpecially if ſhe Bathe at the ſame time ſhe drinks them.

Of Oedematous Swellings in the Lips of the Privities.

Sometimes the Lips of the Privities are ſo much Swoln, that Women cannot bring their Thighs together, or walk without a great deal of Pain. The Lips are Tranſparent as in a *Hydrocele*, which ariſes from the Waters which diſtend them. It is neceſſary to diſcuſs this Tumour before the time of a Womans Labour, becauſe it ſtraitens the Paſſage, and hinders her Delivery. To this end give her a Ptiſan made of Roots of *Dog-graſs* and *Wild Succory*, in three Pints of which diſſolve a *Dram of Chryſtal Mineral*, or a little *Spirit of Salt* Dulcified; or make ſome ſlight Scarifications on the Lips to diſcharge the Waters. Apply to theſe Scarifications a little *Ointment of Roſes*, and Compreſſes ſteeped in ſome Aromatick Wine to ſtrengthen the Parts, confining the Woman to ſuch a Diet, as may hinder the breeding of more Waters. Scarification with a Lancet, is much better than the Application of Leeches, becauſe the Aperture made by theſe little Animals is ſo ſmall, that it cloſes immediately, and Scarifications may be kept open as long as you think fit, by laying on unctuous Medicines.

Theſe Oedematous Tumours are not very Dangerous, when they are without Fever; but when they proceed from an Inflammation attended with a Fever, the Womb is moſt commonly affected too, and it proves fatal to the Perſon.

Sometimes there are varicoſe Swellings on the Lips of the Womb, which cauſes a troubleſome Itching. Women who labour under this Inconvenience, are Sanguine for the moſt Part, and have their Body Bound. To re-

medy this, let them bleeed in the Arm, keep their Body Open, refrain from Copulation, and uſe a cooling Diet.

Of the Veneral Diſeaſes in Women with Child.

If a Woman with Child labour under the Veneral Diſtemper, and be in her laſt Months, ſhe muſt wait till her Delivery before ſhe attempt a Cure, for fear of dying if ſhe happen to be in a courſe of Phyſick at the time of her Labour. If the Diſtemper be not far gone, which is to be known by the Accidents, a Palliative Cure muſt be attempted for the preſent, uſing a regular Diet, and gentle Purging. But if a Woman be in the firſt Months of her going with Child, and the Pox be very High, and attended with ſuch Accidents as threaten her with Death, if her Cure be deferred for too long a Time, let a ſlight Salivation be raiſed by Inunction of the upper parts only, as the Hands and Arms; but obſerve here, you muſt never in this caſe give any Mercurial Preparations by the Mouth, and uſe the utmoſt care leaſt the Frictions throw the Patient into a Looſeneſs, this by diſordering the Womb, and exciting Throes, cauſe an Abortion. Bathing, which is ſometimes uſed as a preparative to Mercurial Inunction, muſt be omitted in this caſe, but ſhe may uſe Ptiſans to humect and prepare her for a Salivation, by which (if it be prudently managed) ſhe may be very well cured, and notwithſtanding retain her Child till its due Time.

Of Abortions.

If a Woman be delivered before her Seventh Month, it is called an Abortion, but if at any time after the beginning of that, to the beginning of the Tenth Month it is called a Birth, becauſe at that time the Child can live, and never before it.

All acute Diſtempers cauſe an Abortion, becauſe they kill the Child, and then it can remain no longer in the Womb. Intermitting Fevers ſometimes make a Woman Miſcarry, by cauſing a great Pain in the Belly, and diſordering the Child, which commonly ſtruggles very much in the time of the Fit. There are ſeveral Accidents which endanger an Abortion, ſuch as are great Vomitings which by the ſtraining of the Parts, compreſs the Womb, and force it to disburthen it ſelf. Nephritick Pains, Cholick and Griping of the Guts, Stranguries when the Woman labours much in making Water, great Looſeneſs with a *Teneſmus*, abundance of the Courſes from the opening of the Womb, exceſſive Bleeding, Flooding from a looſing of the *Placenta*, Dropſie of the Womb; in ſhort whatever makes a great Agitation or Concuſſion of the Woman's Body, as hard Labour, Falls, Leaping, Dancing, Riding, Walking, loud Crying, Exceſſive Laughing, Blows over the Belly, ſudden and ſurprizing Noiſe upon firing a Cannon, or a clap of Thunder, eſpeially in the younger ſort, long Watching, which impairs the Strength, long Abſtinence which weakens both Mother and Child, Stinks and ill Smells, as a Lamp of Oil extinguiſhed, or the fume of Charcoal, the Calloſity of the Womb, or its ſmallneſs, which being compreſs'd by the *Omentum*, wants room to dilate it ſelf for the Reception of the Child, Compreſſion of the Womb by ſtrait lacing the Body, to appear well Shaped, or conceal a big Belly; frequent Copulation, eſpecially in the laſt Months, which opens the Womb. Flegmatick Women, ſubject to the Whites are apt to Miſcarry, becauſe the Womb is Moiſt and Lax, and the *Placenta* eaſily ſeparates. The great abundance of Blood which is carried to the *Fœtus* too plentifully ſometimes ſuffocates it. Vehement Rage which puts the Spirits into a great Hurry and Diſorder, ſudden Fear, or the Relation of bad News, often cauſe a Woman to Miſcary on the Spot. When Children are Monſtrous they never come at their due Time. The ill Poſture of the Child in the Womb ſometimes puts him on Strugling, which looſens the *Placenta*, and opens the Womb. In the laſt place, Children are ſometimes ſo large that the Womb is not capacious enough to contain them, or the Mother able to give 'em Nouriſhment.

If after any of theſe Accidents, a Woman have violent Pains in her Belly and Reins, clods of Blood come away from the Womb, and the Waters are broke, it is certain an Abortion is near. If the Woman feel a great weight in her Belly, and the Child fall as

ſhall on which ſide ſoever ſhe lie, and ſtinking Humours come from the Womb, ſhe will Miſcary of a dead Child; eſpecially if the Breaſts, which before were hard and full, fall and Decay. We have above directed how to prevent theſe kinds of Abortions, and therefore ſhall remit the Reader thither.

A Woman who is ſubject to Miſcarry ought to keep her Bed, uſe a good Diet, and refrain from Copulation, ſo ſoon as ſhe perceives her ſelf with Child, avoiding all Diuretick and Aperitives, and all Paſſions of Mind, go looſe in her Dreſs, wear low-heel'd Shoes, and take care not to Stumble. When a Woman with Child happens to receive any Hurt, let her keep her Bed, have Compreſſes ſteeped in ſome Aſtringent Wine, applyed to her Belly, and let her be immediately bled in the Arm, without deferring it as uſually.

Obſerve here, that a Woman muſt never be Delivered, whilſt ſhe has a continual Fever on her, for in this caſe ſhe will die immediately after her Delivery. It is a miſtake to think her Cleanſings will remove that, on the contrary it encreaſes them, and the Cleanſings are entirely ſuppreſs'd. And therefore all endeavours muſt be uſed to abate the Fever before the Womans Delivery.

How to order a Woman when her Reckoning is up.

When a Womans term is up, ſhe muſt abſtain from all violent Exerciſes, leſt they cauſe a Flooding, occaſion the Child to take a wrong Poſture, or haſten the Birth ſome days before its Time, all which is very prejudicial to the Woman: On the contrary, let her walk moderately, repoſe her ſelf more near the end of her Time, than in the beginning of her Pregnancy, and let her go looſe in her Dreſs. Let her obſerve a Regular Diet, uſing Meats which yield good Juices, and are eaſy of Digeſtion, rather roaſted than boiled, to humect more, and keep her Body Open, that ſo ſhe may not be obliged to take Clyſters, which are apt to haſten the Birth. From the eight or ten laſt Days, let her anoint the bearing Parts with *Oyl of ſweet Almonds*, and Greaſes to relax and ſoften them, and open the Paſſage, eſpecially if it be the firſt Child, becauſe the parts are ſtraiter. Women who are in Years, and never had Children, muſt have a great care to relax the Parts well with Greaſes, becauſe they are Dry, and do not yield ſo eaſily, beſides the Articulation of the *Coccyx* or Rump-bone is very firm, and do's not eaſily give way in Labour.

Women when they are near their Time, may not bleed by way of Prevention, unleſs they are ſubject to Flooding, nor in the ſeventh Month; becauſe this creates a Diſorder in the Body, and puts them in danger of Miſcarrying.

Women near their Time, ought to be provided with ſome able Midwife or Artiſt, whom they muſt ſend to as ſoon as they find any great Pains in their Belly, for ſome times the leaſt Cholick Pain or Gripe flings them into Labour.

How a Woman is to be ordered after her Delivery.

When a Woman is compleatly Delivered, and the Burthen brought away, a cloſure of fine Linen Rags five or ſix times doubled, muſt be applied to her Privities, to prevent the cold Air from entring her Body, which would ſhut the Veſſels, and ſtop the Cleanſings, and cauſe vehement Pain and Griping of the Guts, with an Inflammation of the Womb, a Fever, Pleuriſie, and frequently Death it ſelf.

After the entry of the Womb is clos'd, let the Woman who is newly Delivered, be carryed to a Bed, provided for the Purpoſe, and covered with Cloths to receive the Cleanſings. But if ſhe be Delivered in her own Bed, which is beſt, to avoid the trouble of carrying her to another; let the Cloths and other things be removed, which were laid to receive the Waters and Filth in Labour, and let her be placed in a convenient Situation, that ſo ſhe may take her Reſt, and recover the Strength ſhe has loſt in Labour. Let her Body be raiſed for her more eaſy Breathing, and the flowing of her Cleanſings, which if they are retained cauſe great Pains. Let her put down her Thighs and Legs cloſe to each other, and have a Pillow under her Hams to ſupport them; laſtly,

let her lie on the middle of her Back without turning either to one ſide or another, that ſo the Womb may reſume its Natural Situation.

As ſoon as the Woman is Delivered, give her an Ounce of *Oil of ſweet Almonds drawn without Fire*, with an equal quantity of *Syrup of Maiden-Hair* to cool her Throat, which is heated with her Cries in Labour, and take off her Gripes. However, if the Woman nauſeate this Remedy, forbear it, and give her ſome good Broth as ſoon as ſhe is a little recovered from the Fatigue of her Labour, and leave her to Sleep, ſuffering no noiſe to be in the Chamber, drawing the Curtains, ſhutting the Windows and Doors, not imitating the Practice of ſome who forbid a Woman to ſleep after her Labour; good Repoſe being the moſt proper means to recover Strength, and abate all Accidents which happen.

Of Applications to the Belly and Breaſts of a Woman newly Delivered.

As ſoon as the Womans Bed is fitted, apply to her Privities an Anodyne Cataplaſm made of two Ounces of *Oil of ſweet Almonds*, and two *New-laid Eggs*, both Whites and Yelks ſtirred together, over warm Embers, to the conſiſtence of a Cataplaſm, and ſpread on a Rag, and laid on moderately warm. This Cataplaſm is very good to abate the Inflammation of the Parts after hard Labour; when it has lain on three or four Hours, renew it if the Inflammation ſhall require it; Laſtly, make a Decoction of *Barley*, *Linſeed*, *Chervil*, *Agrimony*, *Marſh-mallows*, and *Violet Leaves*, and waſh the Lips of the Part two or three times a Day, to clear it from Blood and other Filth, proceeding from the Cleanſings, and to appeaſe the Pain, foment it with *Warm Milk*, *Barley* and *Chervil Waters*.

Aſtringents are not proper till fifteen days after Delivery, when the Purgations are come away, and then ſuch as ſtrengthen the Parts may be uſed; as a *Decoction of the Roots and Leaves of Plantain* and *Provence Roſes*, in *Smith's Water*. After the Cleanſings are entirely over, which is about the ſpace of three Weeks, to corroborate and cloſe the Parts, Water of Myrrh, or an Aſtringent Lotion may be injected, *v. g.* ℞. *Pomgranate Pe* 4 *p. Cypreſs Nuts* ℥iß. *Acorns* ℥i. *Terra Sig lata* ℥ß. *Provence Roſes* ℥i. *Roch Alum* ℥ Infuſe all for the ſpace of a Night in h a Pint of *ſtrong Red Wine* alone, or dilut with *Smith's Water* if it be thought t Sharp; or boil it till it be reduced to Pint; ſtrain it through a Linen Clo and preſs it, and with this foment the Pa well Morning and Night.

As ſoon as a Woman is Delivered, let t Skins of ſome Animal be laid on her Bel to keep it Warm. If her Labour has be very Hard, let her be very gently Swathe becauſe her Belly is very Sore; nor mu theſe be ſtraitned till her Cleanſings are a over. Some Midwives and Nurſe-keepe lay a Compreſs doubled on the Belly, an another large ſquare one over that, an keep theſe on with a Napkin in three o four Folds, of a quarter of an Ell Broad, an ſo ſtraiten and compreſs the Belly, but the do only bruiſe and hurt it. It is better t lay a great ſquare Compreſs for the firſt fi teen Days, to keep it in its right Poſition undoing this Bandage ſeveral times a Da to anoint the Belly (if it be Sore, and ſh be Griped) with *Oil of ſweet Almonds*, whic is better than all the *Pomatums* in the World When that time is over, you muſt ſtraite the Belly and bring the Parts together, i which you have nothing to fear, becauſ the Cleanſings being Finiſhed, the Wom is diminiſhed in its Bulk, and there is n great danger of hurting it, provided it b moderately Strait, for if it be too ſtrait th Womb is thruſt down, and the Woma ſuffers great inconvenience by that Mean and the Flux cauſes her Belly to remain bi for a long time after.

If the Woman intends to ſuckle her Child let her Breaſts be covered with fine ſof Cloths, to prevent the Milk from curdlin in them. If the Milk flow in great abun dance to the Breaſt, embrocate them with mixture of *Oil and Vinegar*, and apply Rag dip'd in it to them.

What Diet a Woman ought to obſerve during the time of her lying In.

A Woman newly Delivered, muſt ob ſerve the ſame Diet as Perſons in a Fever t pre-

vent it. She must be very Regular and bstemious the three or four first Days, tak- only some Veal or Chicken-broth, New- d Eggs, or some good Gelly, refraining m all solid Meats.

When the abundance of Milk is over, she y be permitted to eat a little Broth at nner, or a little boil'd or roasted Chick- by degrees encreasing the quantity of her at, which always must be easy of Dige- on; let her ordinary Drink be a Ptisan de with *Dog-grass*, *Barley* and *Liquorice*, *boil'd Water*, which she must not drink old; she may drink a little White-wine uted with Water, after the first five or six ys.

Women us'd to hard Labour, require ore plentiful Nourishment than others, d it is sufficient for these to lessen the antity of their ordinary Food.

Let the Woman keep her Bed and rest her f well, not disturbing her Mind with the ncerns of her Family, and avoid all lking, let her Body be kept open with ysters, giving her at least one Ounce in o Days, and let her be careful to order r self in this Manner, till her Cleansings e over. In the last place to finish all, and rge off the remaining Impurities, let her e *Cassia* with the *purgative Syrups*, and h and cleanse her Body to receive the mbraces of her Husband.

How to dry up the Milk.

If a Woman do's not intend to suckle her ild, apply to her Breasts a Mixture of *and Vinegar*, or *Ointment of Populeum*, d *Galen's Cerate*, all spread on Rags or own Paper, or a Rag dip'd in *Warm Ver-* e, with a little *Alum* dissolved in it to ke it more Astringent, or the *Lees of Wine*, her by it self or mixed with *Oil*. All ese are Repellents, and hinder the Hu- urs which breed Milk from flowing too entifully to the Breast.

To discuss and dissipate the Milk which already gathered in the Breasts, apply a taplasm made of the four Meals, (viz. rley, *Fenugreek*, *Linseed* and *Fitches*) *Ho-* and *Saffron* boiled with a Decoction of royl and *Sage*, or make a Cataplasm of ney alone, or rub the Breasts with it, and lay on them Leaves of *Red Cabbage*, having first cut off the great Ribs, and deadned them before the Fire. Or make a Decoction of *Box-leaves* and *Sage* in Urine, and foment the Breasts with this, and let Rags dip'd in it be applied to them. In the Application of these Remedies, great care must be taken that the Woman do not take Cold, as likewise of inflaming the Breast for fear of an Apostem; wherefore Remedies must be changed as Symptoms alter. One good way to prevent the breeding of Milk in the Breast, is Purging, and keeping the Body Soluble with Clysters. Much stirring of the Arms is apt to create a Pain in the Breast, and therefore the Woman must use them as little as possible.

About three Weeks after a Womans Delivery, when the Milk is entirely gone off, Astringent Medicines may be used to strengthen the Breasts. To this end apply to the Breasts Cloths dip'd in Myrrh Water, or anoint them with *Oil of Wallnuts*, being careful not to cause hard and painful Swellings by the use of Astringent Medicines.

Of Flooding in Women newly Delivered.

When the Burthen is great the Vessels most commonly are very Large, and if it be brought away with Violence, a great Flooding follows. This Flux of Blood happens likewise, when any Part of the Burthen remains behind in the Womb, or there is any false Conception in it; for Nature striving with its utmost Efforts to expel any Extraneous Body, breaks the Vessels, and pours a Torrent of Blood out of them: Sometimes Serosities only flow from the Womb, and the Standers by are inclined to believe the Flooding is stop'd, when indeed the Mouths of the Vessels are only block'd up by clods of Blood; after the removing which, the Flooding Returns, and is often more vehement than before.

Flooding is the most dangerous of all the Accidents which befal Child-bearing Women, and the Blood sometimes comes away in such large Quantities, that there is no time to remedy it, and the Woman dies upon the Spot. If it proceed from some Portion of the Burthen retain'd in the Womb or Clods of Blood, or some false Conception

tion

tion, all endeavours muſt be uſed inſtantly to bring away thoſe Extraneous Bodies; but if after they are removed, the Blood do's notwithſtanding continue to Flow, Bleed the Woman in the Arm if ſhe have ſtrength to ſupport it, and whilſt ſhe Bleeds ſtop the Orifice from time to time, and let her lie along (that is with her Head not too High) and keep her ſelf Still, that by this means the Blood may flow in leſs proportion to the Lower Parts, and a ſufficient Diverſion be made without too much weakning the Patient. Her Belly muſt not be ſtraitned with any Swathe or Compreſs, for all Bandages are Hurtful, if the Belly be Sore. Inſtead of this, let the Air of her Chamber be kept Cool, and cover her lightly for fear of heating the Blood, and putting it into a Ferment, (and ſo encreaſing the Flux) and give her ſome ſtrong Clyſter.

If in ſpite of all theſe Remedies the Flooding do's not ceaſe, lay her upon freſh Straw with a ſingle Cloth on it, and apply to her Loins Napkins dip'd in cold *Oxycrate*, or if it be Winter, a little warm'd. Let her take a little Juice of *Purſlain* alone, or mix'd with her Broths, or make Injections of *Plantain Water*. Some pretend that a Girdle of *Knotgraſs* put about the Waſt, ſtops all Fluxes of Blood.

Every half Hour to recruit her Strength, ſhe may take a little ſtrong Broth, or ſome Spoonfuls of Gelly, or Yelks of New-laid Eggs at convenient diſtances of time, not eating too much at a time, for fear of overcharging her Stomach. Let her Drink be *Red Wine* diluted with a little Water, in which Iron has been Extinguiſhed, and let Cloths be dip'd in Aromatick Tinctures, or in defect of theſe in Burnt Wine, be applied to the Region of the Heart.

When the Flux of Blood begins to ſtop, and the Woman is a little recovered from her Weakneſs, let her uſe a Ptiſan made of *Burnet* and *Barley* for her ordinary Drink. If theſe Remedies have not their due Effect, the Patients Life is in great Hazard, and if ſhe eſcape, you muſt expect in a few days a violent Pain in the Head, with a continual Fever, attended with cold and hot Fits, and this ſometimes is intermitting. Women who recover after violent Floodings, have their Legs ordinarily Swoln for ſome Months after, becauſe the New Blood muſt of ſity be Serous, and cannot recover its Conſiſtence in a conſiderable Time. firſt Courſes which come after Floodi very Plentiful, and in greater quantity uſual, which makes the Woman fea Flooding is returned; but this proceed ly from the largeneſs of the Blood-V is not Dangerous, and requires no othe medy than Reſt, and retraining from pulation.

Of the falling out of the Womb after Deli

When there is a falling out of the W the Woman feels a great weight at the tom of her Belly, great difficulty in ma Water, a Pain in her Reins and Back, a Reddiſh Water comes away from the of the Womb, which is relaxed and out.

To Remedy this Indiſpoſition, let Neck of the Womb be forthwith reduc its Natural Place, and if the Woma young, and the Diſeaſe be recent, ſhe be Cured, but if it be of long ſtanding Cure will be difficult to perform. Womb come quite forth upon a Wo Delivery, and be not immediately Red her Life is in very great Danger. When happens, the Artiſt muſt have a care n miſtake that large Portion of Fleſh w hangs between the Thighs for ſome Ext ous Body, it being the Neck of the W it ſelf, which has loſt its Rugoſities b Relaxation. If he draws this, there is Danger of cauſing a Flooding, and ki the Patient.

For the curing of this Diſeaſe, it is ceſſary to reduce the Womb to its Na Place, and retain it there. To do this the Woman make Water, having firſt cilitate the Work given her Clyſters to cuate the groſs Excrements in the *Re* then let her lie on her Back with her Hips ſed higher than her Head, and foment *Milk* or *Wine* Luke-warm, that which out between her Thighs, and take the of the Womb with a ſoft Rag, and re it to its Natural Place, thruſting it the Hand ſometimes o.. one Side, ſomet on the other. If the Neck of the Wom ſo large that it cannot Enter, anoint it

of sweet Almonds, to put it up the more ly; and when it is reduced, wipe off the for fear it relax the Part, and occaſion falling out again. If the Womb cannot Reduced, there is great danger of its gan-ning, and killing the Woman.

When the Womb is replaced, let the Wo-n be laid on her Back, with her Hips a le raiſed, and her Legs croſſed, and her ghs cloſe to each other, for fear of its ing out again, and put a Peſſary into the k of the Womb to keep it there. Theſe aries are made of a thick piece of Cork, ered with White Wax to preſerve them m Rotting, and keep them from hurting Neck of the Womb, and may be drawn from time to time to cleanſe them; the der will find the Figure of them in Plates annexed at the end.

Whilſt the Cleanſings continue, there is other Way to ſtrengthen the Womb, and p it in its proper Place, but by Peſſaries; aſtringent Medicines ſuppreſs thoſe Pur-ions, and are of dangerous Conſequence; compreſſing the Belly by ſwathing it es the Womb ſtill down. Let the Pa-nt have the Pan given her in Bed, and in ding her Excrements, let her lay her nd before to keep the Womb from falling When the Cleanſings are over, aſtrin-t Injections may be uſed, and the Peſſary ered with Medicines of the like Nature, the Woman be purged if Occaſion re-res. If ſhe be newly delivered, ſhe muſt riſe from her Bed in ſix or ſeven Weeks, ing which Time ſhe muſt refrain from Embraces of her Husband.

Of the falling out of the Fundament.

When the vehement Straining of a Wo-n in her Labour has occaſioned the fal-g out of the Fundament, if the Child be anced in the Paſſage, adviſe her not to her Throes ſo much, and defer the Re-tion till after the Birth, becauſe it can-be done before without bruiſing the t. But ſo ſoon as ſhe is delivered, reduce n the ſame Manner, and obſerving the e Cautions, as in the falling out of the mb: But omit on this Occaſion giving Clyſters, becauſe they are apt to excite a Straining to go to Stool, and endanger a Relapſe.

Of the Hæmorrhoids.

Women are commonly troubled with the Piles during their lying in. To prevent this Inconvenience, let them ſit with their Fundament in a Baſon full of *warm Water* for a Quarter of an Hour at a Time; or foment the Piles with *warm Milk* for the firſt Days, or *Oil of Eggs* beat in a leaden Mortar, either alone or mixed with *Oil of Populeon*, being careful to put in no Ingredients which may irritate them. By procuring a good Evacuation of the *Lochia* from the Womb, this Pain abates of conſequence.

Leaches applied to the Piles in any of the firſt Days are apt to divert the due Evacuation of the Cleanſings, and bring a Fluxion on the Piles; and for this Reaſon (if uſed) muſt be deferred till eight Days or more after Delivery.

Of Contuſions and Rents in the external Parts of the Privities.

The great Dilatation of the Privities, which is made by the Child in making its way out, cannot fail of ſometimes making Contuſions and Lacerations; and if theſe Accidents are neglected, they degenerate into malignant Ulcers, by reaſon of the continual Heat and Filth of that Part. If there be only ſimple Contuſions or Excoriations, there is nothing farther neceſſary than the applying a Cataplaſm made of the *Yelks* and *Whites of new-laid Eggs*, with *Oil of ſweet Almonds*, ſeethed over warm Embers, and ſtirred till they unite. Let this Cataplaſm be ſpread on fine Stupes or Rags, and applied warm, leaving it on for the Space of five or ſix Hours. Next lay Rags dip'd in *Oil of St. John's-wort* on the excoriated Lips, renewing them twice or thrice a day, bathing the Parts each time with *Barley Water* and *Honey of Roſes*, *&c.* to cleanſe them from the Excrements which come from the Womb. When the Patient makes water, cover the Lips of the Privities with fine Rags, to prevent them from being excoriated by the Sharpneſs of the Urine. If theſe Excoriations are painful, the beſt Re-

Remedy is *Oil of Walnuts* drawn without Fire.

Sometimes Midwives do ſo much Violence to the bearing Part, that it is very much inflamed, and a great Abſceſs formed in it. When this happens, it is neceſſary to give vent to the Matter, and after that is diſcharged, to inject ſome vulnerary Decoction made of *Barley Water* and *Honey* into the Cavity, with a little *Honey of Roſes* and *Spirit of Wine*, and ſo treat it in the ſame Manner as all ordinary Ulcers.

Sometimes the *Perinæum* happens to be rent quite down to the Fundament in the Birth, ſo that the *Anus* and Privities make but one common Hole. If this were left in this State, the Woman would be delivered with more Eaſe of her next Child; but notwithſtanding it is better to reunite the Parts as ſoon as may be; becauſe the Excrements coming that Way diſguſt the Husband, and the Woman is by no means fit to receive his Careſſes.

Wherefore having cleanſed the Part with *Red Wine* lukewarm, let the Rent be ſtitch'd with three or four ſeparate Stitches, according to the Length of the Laceration, and take at each Stitch good hold of the Fleſh; and then dreſs it with ſome agglutinating Balſam, as *Arcæus's Liniment*, covering the Wound with Pledgets or Linen Cloths, to prevent the Excrements from falling on it, which would cauſe a great deal of Pain, and hinder its Coalition; and let the Woman keep her Thighs cloſe till the Cure be perfected.

If ſhe afterwards happen to be with Child, let her take care not to anoint thoſe Parts with Greaſes and emollient Oils for ſome time before her Labour, that ſo the Parts giving way in the Birth, may not be torn. A Woman who has once had an Accident of this Kind, ought to employ a skilful and dextrous Artiſt; becauſe in all Labours after, there is very great Danger of Laceration, the Paſſage being very much ſtraiten'd by the *Cicatrix*.

If the Reunion of the Wound be neglected at firſt, the Calloſity on the Edges muſt be cut off with a Pair of Sciſſars, and it muſt then be ſtitched, as is above directed

If the Child ſtop too long in the Pa
there is a Retention of Urine, which cre
an Inflammation and Ulcer in the Blad
which in time becomes a *Fiſtula*, and e
the Urine involuntarily. This *Fiſtula*, w
there is a Loſs of Subſtance, and great
of the Neck of the Bladder is conſumed
the Suppuration, is incurable; otherwi
may be healed by due Care and Diligenc

Of Pains happening to Women after Delive

After a Woman is delivered, ſhe ordi
rily is troubled with ſharp Pains in
Reins, Back, Groins, and ſometimes in
Womb, and all over the Belly. Theſe P
are ſometimes continual, and ſometimes
termitting, and proceed from Wind in
Guts, or ſome extraneous Body remain
in the Womb after Delivery, which Na
ſtrives to expel with her utmoſt Effo
Some falſe Conception, ſome Portion
Burthen, or ſome Clods of Blood in
Womb, may be the Cauſe of theſe Af
pains, which ceaſe not till they are ejec
and are not (like the Wind-Colick) a
viated by giving of Clyſters, but ra
exaſperated.

Sometimes theſe Pains proceed from a
den Suppreſſion of the Cleanſings, and t
the Womb is diſtended and inflamed,
Belly is hard and ſwoln, and the Woma
quickly killed by it.

Sometimes theſe Pains ariſe from an
ceſſive Diſtention of the Ligaments of
Womb, and then they are fixed in the B
Reins and Groins, the Places where t
Ligaments are inſerted; and ſometimes t
reach to the Womb it ſelf, eſpecially w
it has ſuffered much Contuſion in Labou

To prevent theſe Pains ariſing from Wi
let the Woman take a Mixture of *Oil of*
Almonds, with *Syrup of Maiden Hair.*
of Walnuts is better, if the Taſt be not
nauſeous. Theſe Medicines, by their Unc
ſity, make way for the Contents of the
to ſlip more eaſily through them. If
Woman have an Averſion to any thin
this Nature, give her ſome very hot Br
or half a Glaſs of *Hippocras*, provided t
be no Danger of a Fever. She muſt keep
Belly warm, muſt not drink her Ptiſan c

nd muſt lay warm Cloths on her Belly, if er Pains be very troubleſome to her, anoint- g it with *Oil of ſweet Almonds*, or apply- g a *Pancake of Eggs* fry'd with *Oil of Wal- uts*, taking care not to ſwathe it too ſtrait. The next Morning give her Clyſters made of Decoction of the emollient Herbs, with a ittle *Linſeed* boiled in it, adding *Honey of oſes* and *Oil of ſweet Almonds*, of each three unces, or a little *freſh Butter*, repeating heſe Clyſters as oft as Occaſion requires. ome Women, as ſoon as they are delivered, rink the Broth of an old Partridge boiled ith Leeks: Others take a Draught of Milk oiled, to which they put five or ſix *Walnuts* ounded with a little *Sugar*, and ſo ſtrain ll hot through a Linen Cloth. But theſe emedies are inſignificant, if the Pains ariſe om any extraneous Bodies retained in the Womb; for theſe muſt neceſſarily be expelled, nd when that is effected, the Pains will eaſe of their own accord, except the Blood appen to leave any Clods; and if ſo, theſe ill not fail to produce as ſharp Pains as hoſe after Labour.

If the Cleanſings which were copious be- ore, happen to be ſtop'd on a ſudden, ve- ement and ſharp Pains will follow, and are muſt be taken to procure an Evacuati- n of them by Clyſters, Hot and Aperi- ive Fomentations applied to the Privities, nd Bleeding in the Foot.

As for the Pains in the Back and Groins, hich proceed from the great Extenſion of he Ligaments, they are to be removed by eſt, and a Regular way of Living.

Of the Cleanſings, and the Signs when they are Good or Bad.

Thoſe Cleanſings are good which are loody the firſt Days, and after loſe that olour, and by degrees become White. heir Conſiſtence ought to be uniform with- ut any Concretions or Clods, farther they ught to be void of all Acrimony and ill cent, and come away in a moderate Quan- ity.

They muſt not continue bloody longer than he firſt Days, otherwiſe inſtead of Cleanſings, here would be a dangerous Hæmorrhage. When they gradually loſe their Red Colour, nd grow White, it is a ſign the Veſſels be- gin to Cloſe, and when their Conſiſtence is equal without any Clods or concreted Mat- ter, it is certain there is no mixture of any Heterogeneous Subſtance with them; when they have no ill Scent or Acrimony, it is e- vident there is no Inflammation or Corrup- tion of the Womb; In the laſt place when they flow Moderately, the Superfluities only are Diſcharged, but when they flow in great Quantity, the Woman is exceedingly Weak- ned, ſeized with Convulſions, Swooning Fits, extreamly Emaciated, and continues Pale for a long Time, and her Thighs and Legs Swell, and become Hydropick.

Of the Suppreſſion of the Cleanſings, and the Accidents which follow thereupon.

When the Cleanſings are ſuppreſs'd, the Humours corrupt by their long ſtay in the Womb, or cauſe ſome Inflammation. If the Cleanſings happen to be ſuppreſs'd in the firſt Day, there enſues an acute Fever, a vehement Pain in the Head, Pains in the Breaſt, Reins and Back, a Suffocation and an Inflammation, which extends all o- ver the Lower Belly, and this becomes di- ſtended. Beſides this, the Woman finds a great difficulty of Breathing, ſtoppage at Stomach, palpitation of Heart, *Syncopes*, Con- vulſions and *Delirium*, and theſe Symptoms frequently prove Mortal to her. If the Sup- preſſion continues, there is great danger of an Abſceſs in the Womb, or perhaps of a *Cancer* or Apoſtumes in the Lower Belly, Sciatica's, Lameneſs or Inflammations, and Abſceſſes of the Breaſts, according as the Hu- mours take their Courſes, and theſe Sup- preſſions are more dangerous by much, than thoſe of the Courſes.

A Looſeneſs ſometimes is the cauſe of the Suppreſſion of the Cleanſings, and ſometimes it proceeds from a diſorder of the Spirits cauſed by a violent Fear, Sadneſs, or Deje- ction of Mind, Anxiety, or any diſmal Ap- prehenſion. Great Cold conſtringes the Veſſels, and coagulates the Blood in the Womb, Cold Drink, and Reſtringent Meats have the ſame Effect, and very much ſtirring diffuſes the Humours through the whole Body, and hinder their diſcharge by the Womb.

To bring the *Lochia* well down, let the Woman avoid all perturbations of Mind; let her lie in her Bed with her Head and Breaſt a little raiſed, (keeping her ſelf very quiet, that ſo the Humours may be more eaſily carried downwards) let her obſerve a good Diet, ſomething Hot and Moiſt; let her rather uſe boil'd Meats than Roaſted, and if ſhe be any thing Feveriſh, drink Broths only with a little Jelly, avoiding all binding Things, and let her Ptiſan be made with Aperitives, ſuch as Roots of *Succory*, *Dog-graſs*, and *Aſparagus*, with a little *Aniſe-ſeed* and *Hops*, and every other time let her take a little Syrup of *Maiden-Hair* in a Glaſs of the Ptiſan, and carefully ſhun Cold Drink. Let Clyſters be given her, and her Lower Parts fomented with an Emollient and Aperitive Decoction made of *Mallows*, *Marſh mallows*, *Pellitory of the Wall*, *Camomil*, *Melilot*, Roots of *Aſparagus* and *Linſeed*, with which Decoction the Womb may likewiſe be Injected, and with the remaining Herbs let a Cataplaſm be made, adding a little *Oil of Lilies*, or *Hog's-greaſe*, and apply this very hot to the Belly. Beſides this, let her Thighs and Legs be ſtrongly rubbed down, bathing them with the ſame Emollient Decoction very Hot. But here bleeding muſt by no means be forgot, and if the Woman be very Sanguine, firſt bleed her in the Arm, and after when the Symptoms are abated, in the Foot.

Of the Inflammation of the Womb after Delivery.

Very often the ſtopping of the *Lochia*, do's cauſe an Inflammation of the Womb, and is the Death of moſt Women to whom it happens. Sometimes this Inflammation ariſes from ſome Hurt or Bruiſe.

An Inflammation of the Womb may be known, by being much more ſwelled after Labour than is Requiſite, the Woman feels a very great Heavineſs in the bottom of her Belly, and that is ſwelled and blown up almoſt as big as before Delivery, ſhe has a difficulty in making Water, and going to Stool, or ſhe perceives her Pain Encreaſe in voiding her Excrements (becauſe the Womb preſſes the *Rectum*, and by its Proximity, communicates the Inflammation, as well as to the Bladder) to which add, that in this caſe there is a High Fever, and great di culty of Breathing, and a Hiccough, V mitings, Convulſions, and Death ſoon fo lows if not timely prevented.

Contuſions of the Womb often cauſe A ſceſſes and Schirrous Swellings, which co tinue for a long time, and ſometimes e in incurable *Cancers*.

As ſoon as the Womb appears to be i flamed, extract or procure the Expulſion all Extraneous Bodies, which may happ to be lodged in it, without doing the le Violence to it for fear of exaſperating t Malady; correct the Humours by a Coo ing Diet, and let the Patient uſe Food th Nouriſhes little, drinking only Broth (b not too ſtrong) made of *Veal* and *Pulle* with cooling Herbs, ſuch as *Lettuce*, *Pu ſlane*, *Succory*, *Borage*, *Sorel*, or the like; her abſtain from Wine, and drink a Ptiſa made of the Roots of *Succory*, *Dog-gra Barley* and *Liquoriſh*; let her keep her ſe very quiet in her Bed, and not be Swath too Strait; let her Body be kept open wi ſimple Anodyne Clyſters, without the le Sharpneſs, for fear of cauſing Throes, whi extreamly pain the inflamed Part, and of a Paſſions of the Mind, let her eſpecially avo Anger.

The Redundancy of the Humours may Evacuated, and diverted by Bleeding; Fi in the Arm, and after in the Foot if there Occaſion. It is convenient to cover the Be ly with *Galen's Emplaſter* to cool it, or en brocate it with *Oil of ſweet Almonds*, mix with a little *Vinegar*. Injections may lik wiſe be made into the Womb, but the muſt be cooling only, without the leaſt ſtringency, (ſuch as are made of *Barley-W ter*, with *Oil of Violets*, or *warm Milk* a very proper) obſerving to uſe nothing whi is exceſſively Cold, avoiding all ſorts of D ureticks, and keeping the middle way in t Cure, for fear of inflaming the Womb the uſe of hot Things, which provoke t Flux. Bleeding is good for the making a Evacuation, without any of theſe Con ſequences. But obſerve here, all Purges ho mild ſoever, are hurtful in this Caſe, well as in all Inflammations and Fluxio on the Womb, even the leaſt that can ha pen.

Som

Sometimes an Inflammation of the Womb converted into an Apoſthume, which elds a great quantity of Matter; in this ſe you muſt be contented with a good Re- men and Detergent Injections to carry off e *Pus*, and for this purpoſe you may make ſe of a Decoction of *Agrimony* with *Honey*, *Syrup of Wormwood*, adding (if the Cor- ption be great) a little *Spirit of Wine*.

If the Apoſthume degenerate into a Can- rous Ulcer, it will only admit of a Palli- ive Cure.

Of Schirroſities of the Womb.

Schirrous Swellings frequently proceed om the Application of Cold and Reſtrin- nt Medicines to the Womans Belly, or jecting ſomething of that kind into the Vomb.

If the internal Orifice only is Schirrhous, e Womb is not larger than the common ze; but if the whole Body of it be affect- d, it is exceedingly Tumefied, and this of- n happens upon an Inflammation after La- our, or upon ſome diſorder or ſuppreſſion f the Courſes. For the more certain know- g there is a Schirroſity in the Womb, lay our Hand on the Womans Belly, or intro- uce your Finger into the Womb, and you ill find it big with an extraordinary Hard- ſs. The inner Orifice is Larger, Harder, horter, and more unequal, than it ought f there be no Inflammation, or the *Schirrous* e not diſpoſed to Cancerate, it is indolent, ut if it be inclined to either of theſe, the ain is very Great.

If the Womb be Schirrous, the Woman nds a great Laſſitude, a weight at the bot- om of her Belly, feels Pains in her Reins, roins and Hips, and has a frequent Moti- n to make Water, and theſe Pains increaſe hen ſhe makes an Effort to void her Excre- ents, becauſe the Womb compreſſes the *ectum*, and the Bladder by its Weight. The ourſes are entirely Suppreſs'd, or in very mall Quantity, or irregular, which is oc- aſioned by the Obſtruction of the Part.

The beſt way to begin the Cure, is by leeding in the Arm, and gentle Purging, or violent Purging in this caſe is Hurtful, nd exaſperates the Diſeaſe, Emollient Oils, reaſes and Cataplaſms applied to the Belly, and Emollient Injections into the Womb are ſerviceable, after which the Patient may uſe the whole or Half-bath. After ſhe has for ſeveral days been treated in this Manner, let her bleed in the Foot, reſtrain from Co- pulation, and obſerve a cooling Diet to al- lay the Heat of the Blood. Thin Milk, e- ſpecially that of Aſſes, is good in this Di- ſtemper, but the drinking the Mineral Wa- ters, is yet better.

Of a Cancer *of the Womb.*

This is commonly the conſequence of a Schirroſity, Inflammation or Apoſthume, after Labour. Ill conditioned Whites, and virulent Gonorrhœas of long ſtanding, con- duce very much to this, by the Eroſion of the Womb.

It ſometimes happens to Women upon a ceſſation of their Courſes, becauſe the Veſ- ſels being ſtop'd by degrees, the Blood brought to the Womb, ſtagnates, corrupts and ulcerates the ſubſtance of the Part, which ſoon becomes Cancerous.

When a Woman has a *Cancer* in the Womb, ſhe feels a pricking Pain, and a heavineſs which is cauſed by the ſharpneſs of the Humours, and the bearing down of the Womb. This Pain extends to the Reins and Groins, and the Patient feels a great weight at the bottom of her Belly, and a general Laſſitude of the whole Body; ſhe has a dif- ficulty of Urine, and a Serous, Fœtid, Vi- rulent, Blackiſh Gleet comes from the Womb. Sometimes the Blood comes away wholly Fluid, and ſometimes it is concret- ed. When the Ulceration is in the inner Orifice of the Womb, it may be perceived by the Finger, or may be ſeen by the help of the *Speculum Matricis*; but if it be in the bottom, there is no way to know it but by the Condition of the Matter which comes from it, and by the Symptoms above men- tioned. Theſe Ulcers are very unequal, Sordid and Stinking, and the Corruption is ſometimes ſo great, as to breed Worms.

Cancers of the Womb are incurable, and only admit of Palliating Remedies, which abate the violence of the Pains. The Patient muſt not take any thing Sharp, either in- wardly or outwardly, for fear of increaſing the Diſeaſe and Pain, and haſtning her End.

Women who have a *Scirrhus* or Apoſtem in their Wombs, or who are ſubject to Flooding, or have a Ceſſation of their Courſes, eſpecially when they are advanced in Years, are moſt of all ſubject to *Cancers*. Such Perſons as are threaten'd with this Diſeaſe, upon the account of the ceaſing of their Courſes, have no better Expedient than to bleed in the Arm at convenient times, to ſupply the Defect of that Evacuation, and by this means prevent too great a Redundancy of Blood and Humours in the Womb; and this they ought to do for ſeveral Years together, till thoſe Veſſels which conveyed the Blood are very much diminiſhed. If ſuch a Woman has been very ſubject to frequent Hæmorrhages, let her refrain from Copulation, becauſe this Action brings Blood into the Part; let her obſerve a cool and moiſt Diet, and ſhun all Aperitive, Diuretick or violent Purging Medicines; let her drink new Milk from the Cow to ſweeten the Blood, and frequently drink Broths made of Pullets, whoſe Bellies were firſt ſtuffed with the cold Seeds. The Cow whoſe Milk ſhe drinks muſt be ſound, and not overheated, fed with good Paſture, and one who has not lately calved; for all Errors of this Kind are dangerous.

Of a Looſeneſs happening to a Woman newly laid.

A Looſeneſs, when it happens to a Woman ſoon after her Delivery, is dangerous; becauſe it diverts the Cleanſings from flowing to the Womb, and by this means often proves fatal to the Patient. That which makes this Caſe dangerous is, that Remedies proper to ſtay the Flux, ſuch as Aſtringents and Purgatives, are not to be admitted of, eſpecially at firſt. In this Caſe therefore, give the Patient ſtrong Broths, to ſtrengthen her, and abate the Flux; give her Anodyne Clyſters made of a ſimple Decoction of *Bran*, or the cooling Plants, either alone, or with the Addition of *Milk*, or the *Yelks of Eggs*, to abate the Pain; or let her take ſome Grains of *Laudanum* in the Yelk of an Egg. If the Looſeneſs be accompanied with a Fever, let her bleed. However, if there be a viſible Danger of the Woman's loſing her Life by the continuing of the Flux, uſe all common Remedies in this Caſe, without the leaſt Scruple; and when that is ſtop'd, attempt to procure an Evacuation of the Cleanſings which for a time were ſuppreſſed.

Of Ruptures of the Belly in Women with Child.

The Womb ſometimes is diſtended to a large a Size, that it breaks through the *Peritonæum*, and cauſes Ruptures ſo large, as contain the Womb and Child in it. The Ruptures ſometimes happen above and below the Navel, between the *Muſculi Recti* in the Navel it ſelf, and in the Groin which are the weakeſt Parts of the Belly. They commonly proceed from great Straining of a Woman in Labour, or vehement Vomitings, or violent and frequent Sneezing or ſome accidental Blow on the Belly. The Diſeaſe cauſes Want of Digeſtion, Vomiting and ſevere Colick Pains; and often when the Gut which is fallen cannot re-enter Death is the Conſequence; or at leaſt there is a Neceſſity of making an Inciſion into the Belly, as in a *Bubonocele*.

To avoid Accidents of this Nature, the Woman muſt be forbid to lace her ſelf, or ſtraiten her Belly, that it may have Room to extend it ſelf every way. But if ſhe happen to have a Rupture, ſhe muſt wear a Bandage with Compreſſes adjuſted to the Part, to prevent the Guts from intruding themſelves into the Swelling. If the Rupture be in a Place into which the Womb cannot inſinuate it ſelf, the Woman muſt have an eſpecial Care to prevent this fatal Accident by the Help of good Bandages, and ſhe would do well to keep her Bed during her being with Child.

Of an Inflammation of the Breaſts after Delivery.

If a Woman with Child has received a Blow on her Breaſts, or compreſſed them by lying on them, or has left too great a Quantity of Milk in them, without drawing them, an Inflammation will infallibly enſue, which ſometimes is the Cauſe of Apoſthumes or Scirrhoſities, which degenerate into *Cancers*. The Breaſts being very ſenſible, when they are inflamed, ſoon produce a continual Fever with *Deliriums*.

The

The beſt Way to prevent an Inflammation f the Breaſts is to procure a good Evacua- ion of the Cleanſings, and if they are ſup- reſs'd, to provoke them, that ſo all the umours, which flow'd too plentifully to he Breaſts, may take their Courſe down- ards. For this purpoſe bleed her firſt in he Arm, and then in the Foot. In the ean time embrocate the Breaſts well with Mixture of *Oil of ſweet Almonds*, and after hat apply *Galen's cooling Emplaſter*, with a hird Part of *Populeum*; or a Cataplaſm made f the *Settlings found in a Cutler's Grindſtone rough*, and *Oil of Roſes*, with a little *Vine- ar*: Or if the Pain be violent, make a Ca- plaſm with the *Crumb of white Bread*, *Milk*, *il of ſweet Almonds*, and the *Yelks of Eggs*, nd apply it to the Breaſts, and over that y Compreſſes dip'd in *Oxycrate*, *Plantane ater*. But great Caution is to be uſed in ſtringent Remedies, leſt (if they be too rong) they occaſion a *Scirrhus*, which in me may become cancerous.

After the Height of the Inflammation is ver, let Diſcutients be uſed to diſſipate the ilk, which flows in too great Abundance the Breaſts; but the beſt Way in this afe is to draw them by ſucking; for if y great Quantity be left in the Breaſts, it ill neceſſarily ſuppurate. However, it is eceſſary to uſe diſcuſſing Applications firſt, ecauſe ſucking brings Milk into the Breaſts. ut if the Milk runs off it ſelf, leave it, for is enough to empty them. Milk may reſolved by applying a Cataplaſm of *pure oney* to the Part, or rubbing them with a d Cabbage Leaf, having firſt deaden'd it the Fire, and taking care not to ſtraiten e Breaſt. The following Diſcutient is ve- good: Take a good *red Cabbage*, and boil in *River Water* till it be ſoft, and the Wa- evaporated; pound this in a Wooden or one Mortar, and after paſs it through a ve, adding *Honey* and *Oil of Camomil*, and ply this Cataplaſm to the Breaſts.

Let the Woman in the mean time uſe a ol Diet, not very nouriſhing, to prevent eeding too much Chyle; let her keep her dy open, that ſo the Humours may diſ- age themſelves downwards while the In- mmation remains; let her lie in Bed on Back, becauſe when ſhe is up, the eight of her Breaſts increaſes the Pain. On the fourteenth or fifteenth Day after her Delivery, when the Cleanſings are pretty well come away, and ſhe is free from a Fe- ver, ſhe may be purged as often as ſeems convenient. If (notwithſtanding the Uſe of theſe Remedies) the Pain does not abate, there is Reaſon to believe there is *Pus* in the Breaſts.

Of the Curdling and Clodding of Milk in the Breaſts.

About the fourteenth or fifteenth day af- ter Labour, the Milk often is apt to Curdle, and then the Breaſts become hard, unequal, and rugged, without any Redneſs, and all the Glands filled with curdled Milk, may eaſily be diſcerned; The Woman finds a great Pain, and cannot Milk them as before, ſhe finds a ſhivering in her Back, which ſeems to be like Ice. This is followed by a Fever of four and twenty Hours Continu- ance, and ſometimes leſs, if the clodding of the Milk do not turn to an Inflammation of the Breaſt, which will undoubtedly happen, if it be not emptied or diſſipated.

This clodding of the Milk, for the moſt part proceeds from the Breaſts, not being well Drawn, either becauſe ſhe has too much Milk, or the Infant is too Weak, or ſhe has no deſire to be a Nurſe; for the Milk in theſe caſes remaining in the Breaſt, Sowres and Clods: This Accident may ſometimes happen from taking Cold, or keeping the Breaſts not well cover'd.

The moſt certain Remedy in this Caſe, is to draw the Breaſts ſpeedily, till they are well Evacuated, but becauſe the Woman is not ſoft Milch'd, and the Child cannot draw them ſtrongly enough, let another Woman draw them till the Milk comes Freely, and then ſhe may give the Child Suck; and to the end that ſhe may not afterwards breed more Milk than the Child can Draw, let her uſe a Diet that yields but little Nouriſh- ment, and keep her Body Open. But when it happens the Woman neither can nor will be a Nurſe, then her Breaſts muſt not be Drawn, for fear of attracting more Hu- mours, for the Diſeaſe will ever Recur, if they be not Emptied; wherefore it is neceſ- ſary to prevent the coming of any more Milk into them, and to reſolve and diſſipate

that

that which is there. For this purpoſe the Woman muſt be bled in the Arm, have ſtrong Clyſters given her. Bleeding in the Foot, and Purging, are very ſerviceable in this Caſe, and to reſolve and diſſipate the curdled Milk, apply ſome Cataplaſm above recommended, as that of pure *Honey*, or the *four Meals* boiled in a Decoction of *Sage*, *Mint*, *Smallage* and *Fennel*, mixing with it *Oil of Chamomil*, with which Oil the Breaſts may be well Anointed. Clothes laid over Pots of *Salt Butter* are very good, after having uſed all things proper to reſolve the concreted Milk.

Of Apoſtems in the Breaſts of a Woman new laid.

If a Woman feels a great Pain, and there be a ſtronger Pulſation in one place than another, a Hardneſs, a Livid Colour, with a Softneſs in the midſt, it is a ſign the Breaſts will Apoſtemate.

To ſuppurate the Apoſtem, apply on the Breaſts an Emollient and Ripening Cataplaſm made of *Mallows*, *Marſh-mallows*, with their Root, *Lilly Roots* and *Linſeed* bruiſed, and boiled to a Pap, that it may be pulped through a Sieve, and ſo no hardneſs may be left to hurt the Breaſts, which at that time are in great Pain; after mix a good quantity of *Hog's-greaſe*, or *Baſilicon* with it, or lay a little Cloth thick ſpread with the ſame *Baſilicon*, upon the place where it is likely to Break, and the Poultis all over it, renewing it twelve Hours after, or at fartheſt next day, continuing this Remedy till the Apoſtem be Ripe. Or you may make uſe of the *Emplaſtrum Divinum*, malaxed with *Oil of Lilies*; this is preferable to all others of the like Nature, for this purpoſe. As ſoon as the Apoſtem is Ripe, it muſt be opened, if it open not of it ſelf. The time when it is fit, may be known by the ceaſing of the beating the Woman felt before in her Breaſts, and that the Pain and Fever is very much Abated, and then beſides the middle of the Apoſtem is raiſed to a Point, and very Soft, and the contained Matter may by the Finger be perceived to Fluctuate. The Apertion muſt be made with a Lancet, or with a grain or two of ſome Cauſtick, making it large enough to evacuate the concreted Matter. It is beſt to uſe the Lancet, becauſe there is no loſs of Subſtance, and Scar is not ſo Diſfiguring. The Orifice be made in the moſt commodious Place, the Evacuation of the Matter, taking care none of the large Veſſels near the Arm be opened. After that all the Matter putrified cloded Milk is not diſcharged, terge the Apoſtem after the ordinary ner, obſerving not to make the Tents long, or too hard, but very ſoft Doſſi Lint, without thruſting them too fa and faſten a Thread to the firſt to dra out, if there be occaſion, becauſe theſe ſtems are moſt commonly Deep. If t be great Pain, dip the Pledgits in O *Eggs*, or *Baſilicon* mix'd with ſome D ſtive, if there remain any thing yet to purate; after this deterge the Ulcer Honey of *Roſes*, or *Ungnentum Apoſtolor* laying on the *Emplaſt. Divinum*, to ſo and diſcuſs the remaining Hardneſs.

If there be ſeveral Apoſtems in diffe places of the Breaſt, in this caſe there need of laying open every one of theſe ſ Holes, but it ſuffices to make one or Apertures in ſome depending part larg nough, becauſe the Breaſts are Spungy, theſe Apoſtems communicate with eac ther. But the moſt prompt Remedy to drive the Milk quite back; and for purpoſe give the Woman Clyſters, and pu her frequently, confining her to a Diet w is not very Nouriſhing.

You muſt not always ſtay till the C plaſms break the Abſceſſes, and ſometi there is a neceſſity of opening them wi Lancet, becauſe if the Matter Stagnate long in the Breaſts, it will corrode Glandulous Part, and form Sinuoſities difficult to cure.

Of the Excoriation and Loſs of the Nipple

Very often Women that are Nurſes, eſpecially the firſt time, and ſubject to h their Nipples Excoriated, for the ſmall H of the Nipples not being ſufficiently op ed, the Child takes more Pains to Su than when the Breaſts do almoſt run of the ſelves. Sometimes theſe Chaps and Exco tions, do ſo encreaſe by the Child's co nual Sucking, that in the end it quite ta the Nipple off from the Breaſt, and the W

an is no longer capable of giving Suck, d there remains an Ulcer very hard to be red.

This may ſometimes happen from Chil- ens biting and mumping the Nipples, and metimes their Mouths are ſo Hot, that y make the Nipples Sore, as when they e thoſe little Ulcers called *Aphæ* or Thruſh, and much ſooner if they have Pox, with which they infect their Nur-

Theſe Excoriations if they are neglected, length become very Malignant Ulcers. Therefore as ſoon as they begin, let the oman forbear giving her Child Suck, till y are perfectly Cured, and in the mean ne drive back the Milk, for fear of an In- mmation, from too great abundance of If only one Nipple be Sore, ſhe may e Suck with the other; to theſe ſore Nip- s Deſiccative Medicines muſt be applied, *Alom* or *Lime-water*, or they may only be thed with *Plantain Water*, laying on them all ſoft Rags dip'd in thoſe Liquors, or ply an Emplaſter of *Ceruſs* or *Pompholyx*, *Starch*; but an eſpecial care muſt be taken at nothing be applied which may diſguſt e Child, for which reaſon many only uſe *ney of Roſes.*

To prevent Hurts in theſe Parts, and hin- r the Woman's Clothes from cleaving to em, let a little cap of Lead be put on, as ell to defend them, as to give Iſſue to the *ors*, which proceed from thoſe little Ul- rs, or that the Milk which diſtills from the reaſt, may paſs that way.

If the Child has ſucked off the Nipple, e Milk muſt then be quite dried away, cauſe otherwiſe it would be impoſſible to re theſe Ulcers, which in time would be- me Callous and Malignant.

If the Child be put to another Nurſe, d the Ulcers in its Mouth have no Ma- gnity, 'tis enough to waſh them with *Bar- -Water*, mix'd with a little *Juice of Citron*, d let the Nurſe uſe a cooling Diet.

When the Nipples are quite loſt, the ſmall oles are cloſed up by the Ulcers, but if withſtanding ſhe ſhall deſire to give Suck, other Woman may by degrees make her w Nipples, after the Ulcer ſhall be per- ctly Healed, whoſe Sucking by degrees will aw them out, and by this means unſtop the Root of the Old Nipples; or if ſhe have no Woman to Suck her, let her uſe a Glaſs Inſtrument, with which ſhe may her ſelf Suck them five or ſix times a Day, and to ſhape them and preſerve them when they are drawn out, let her put on them a ſmall cap of Wood.

Of the Swelling of the Legs and Thighs in a Woman newly Laid.

If the Swelling be very great, there be an Inflammation, and it proceed from Suppreſſion of the Cleanſings; if there be a Fever, difficulty of Breathing, a great Tenſion and Pain in the Belly, the caſe is dangerous. If there be but an indifferent Swelling only, without any of the above mentioned Accidents, there is no great difficulty in the Cure.

For this purpoſe, procure a good Evacuation of the Cleanſings, give the Woman an Aperitive Ptiſan, made with the Roots of *Fennel*, *Parſley* and *Dog-graſs*, with a little *Cryſtal Mineral:* Sometimes give her an Ounce of *Syrup* of *Maiden Hair* in a Glaſs of the Ptiſan, with five or ſix drops of the *Dulcified Spirits of Salt*, and about half a Dram of *Sal Polychreſtum.* If ſhe have no Fever, and it be fifteen Days after her Delivery, ſhe may be Purged.

Of the Suffocation of the Womb after Delivery.

Some Women in Hyſterick Fits have a high Pulſe, others a very low one, as it were ſunk in, others have ſcarce any at all; ſome become Pale and Motionleſs, others have a good colour in their Cheeks, and have ſeveral Convulſions, ſome have not the leaſt appearance of Breath, and others breath with great Difficulty, and great Heavings of the Breaſt; ſome are inſenſible, without remembring any thing they have done, or ſaid; others never loſe their Reaſon or Judgment, ſome are Gay and Merry, Laughing and Singing, others are Sad and Dejected. Some are attack'd with frequent Fits, others very ſeldom. The Fits ſometimes laſt for ſeveral Hours or Days, and ſometimes are ſuddenly over. The moſt ordinary Signs of the Hyſterick Paſſion, are difficulty of Breathing, which cauſes a Suffocation with a great

a great Conſtriction of the Throat, as if the Patient had a Morſel which ſhe could not Swallow, and the Throat were griped with a Man's Hand. There is a great Weakneſs and Palpitation of the Heart, *Nauſea's*, and ſometimes a Flux of Water and Seroſities from the Mouth; frequent yawning, ſometimes is a Fore-runner of the Fit. The Woman feels a Pulſarion of the Arteries in the bottom of her Belly, a Leaping and Contraction of the Womb, a Ruſling of Wind in the Stomach and Guts which diſtends them, and bears up the Diaphragm, ſometimes ſhe is delirious in the Fit, and has Convulſive Motions preceded by a Pain, Weight, and Dizzineſs in the Head, Dazling of the Eyes, Drowſineſs and Forgetfulneſs. Sometimes after theſe Convulſive Motions, ſhe is thrown into a Mortal Apoplexy, or a Palſie of one ſide, which continues for ſeveral Years.

To prevent this Diſtemper, if there be a Suppreſſion of the Cleanſings, bring them down by relaxing all the Parts round the Womb, and the Thighs by a Half-bath, by bleeding in the Foot and Purging. If it be a Big-bellied Woman who labours under this Diſtemper, let her only Bleed, and keep her Body open with Clyſters. The uſe of the Mineral Waters is admirable, to prevent the Hyſterical Paſſion, in caſe the Patient be not with Child. If the Suffocation proceed from any extraneous Body in the Womb, extract it, or procure its Expulſion by Medicines. Let the Patient avoid all ſweet ſcented Things, all Sweet-Meats, or any thing prepared with Sugar, all melancholy and diſturbing Paſſions, and keep her Body Open. If ſhe be a Marryed Woman, let her often embrace the privileges of that State, if not, let her keep a cooling Diet, uſing Emulſions and Bathing.

In the Fit which is ordinarily attended with difficulty of Breathing, Suffocation, Weakneſs, Palpitations of the Heart, it is uſual to preſent to the Patient things which have a very ill Scent, as *Patridge Feathers*, or Soles of Shoes burnt. Some fling a Dram of lighted *Camphire* into a Pot of Water leaving it till it be extinguiſhed, and give this Water to the Patient to Drink; or give two or three Drops of Oil of *Amber* in a Spoonful of Broth, or *Orange-flower Water*. But the beſt way is to unlace the Patient's Clothes, and give h Spoonful or two of *Cinnamon-Water*, o *qua-vitæ*; this is a good Cordial, promptly diſſipates the Windineſs in the mach, which is the cauſe of theſe Suff tions. A Spoonful or two of Wine alo very good. Smelling to *Spirit* of *Wi* better than Vinegar. The ſcent of *b Paper*, or a *Musket Match*, is very good ſhe be with Child, ſhe may not ſmel ſtinking Scents, for fear ſhe Miſcarry. ſhe be not with Child, let her take Sn ing Powders, with Powder of *Betony*, *Tobacco* without Perfume. You may p Grain or Two of Salt into the Patie Mouth, to bring away the Water and S ſities which flow thither in great abunda

If any large Evacuations precede the as a great Looſneſs, or an immoderate F of the Whites, or a great abundance of Cleanſings, and the Woman's Pulſe be L and Languid, her Face Pale, and her B Cold, you muſt forbear Bleeding; on contrary, if ſhe have a Florid Colour in Face, her Pulſe be High, and there b Suppreſſion of the Courſes or Cleanſings fore, and ſhe have Convulſive Motion think bleeding is very Proper; firſt in Arm, and after in the Foot.

Of the Whites.

It is very difficult to diſtinguiſh Wh in Women, from virulent *Gonorrhœa's*. the Whites the Matter is Whiter, more rous, eſpecially if it be Copious, and fœtid than in *Gonorrhœa's*. On the cont ry, in Venereal Caſes it is more Stinki Thick, Blackiſh, Yellowiſh, Greeniſh, a ſometimes is of a reddiſh Colour, by mixture of a bloody Seroſity. When a W man has the Whites, the Courſes become regular; ſometimes inſtead of her Cour ſhe has a Flux of Blood which becomes rous, and appears like the Water in wh Fleſh has been Waſhed; when it is a li abated, after ſome time ſome clods of bl corrupted Blood come away among the trid Matter. A Woman who has the Whi can lie with her Husband without Pain, ſhe who has an Ulcer cannot. The Ma which comes away in the Whites, m commonly is White, Serous, not un

Whey, without any ill Scent, though sometimes it is Yellow, Stinks, and by its Acrimony causes a great smarting of the Parts. It is very difficult to distinguish the Whites from *Gonorrhœa's*. Women with Child are more subject to this Distemper, which is occasioned by the Suppression of their Courses. Few Women are wholly exempt from this Inconvenience, but at some time or other labour under it; but some are much more subject to it than others. Women who have not their Courses Regularly, those who are Phlegmatick, have a soft Skin, are pale Coloured, or lead a melancholy Sedentary Life, are most of all subject to the Whites; but young Girls who are not of an Age to have their Courses, never have them. The Whites weaken the Woman, humect and relax the Womb to that degree it cannot contract and close it self, and by consequence cause Barrenness. The Womans Countenance becomes Pale, her Legs Swell, she loses her Appetite, has Pains in her Back, Weakness, Palpitation of Heart, and Hysterick Fits. If the Whites continue long the Woman is Emaciated, and becomes Hectical; Nay, sometimes such a Relaxation of the Womb ensues, that it becomes cancerous if Neglected.

For the Cure of this Distemper, Bleed and Purge the Patient well, and prescribe a good Diet to her; let her go to the Baths, and after drink the Chalybeate Waters, or others of the like Nature. Phlegmatick Women whose Flesh is Tender and Soft, ought to drink the hot Waters, as those of *Bourbon* and *Vichy* in *France* [or the Bath in *England*] or a Sudorifick Decoction made of the Roots of *China* and *Salsa-parilla*, taking for a fortnight before, a Glass of a Laxative and Diuretick Ptisan made of *Maiden Hair*, Roots of *Dog-grass*, *Asparagus*, *Smallage* and *Fennel*, with a Dram of *Senna*, adding every three days, four or five drops of the *dulcified Spirit of Salt*, or half a Dram of *Sal Polychrestum*; and during this time, let her observe a good Diet, refraining from Copulation, and avoiding all Melancholy and Dejection of Mind. The most proper time to begin the use of Medicines, is immediately after the Courses are over. After these Medicines, the Patient may use Astringent Injections made of equal parts of *Plantain* and *Myrrh Water*, but she must forbear when the time of the Courses is near, for fear they cause a Suppression; for my Part, I would not advise any Woman to use Styptick Applications, because this part is the common Sink, where all the Filth of the Body is Discharged.

When the Whites are very Acrimonious, and cause a smarting of the Parts, *Barley-water* or *Whey*, or simple Water may be injected three or four times a Day, (except in the time of the Courses,) to allay the Heat and Pain, prescribing a good Diet, and between whiles, purging her till the cure be Compleated.

Tho' the Patient may seem to be cured, and the Whites cease, or at least are very much abated, the Woman must notwithstanding frequently take Medicines, and all her Life observe a good Diet, otherwise she will be in very great danger of a Relapse.

Of Dieting and ordering a New-born Babe.

It is not usual to give a Child Suck, till ten or twelve Hours after its Birth, and then the Nurse must milk a little into its Mouth, and on its Lips, to give it a Relish, and when the Child has taken the Breast, she must squeeze it till it be accustomed to Suck of its own Accord.

If a Nurse have plenty of Milk, give the Child no other Food for the first two Months; but for the first two or three Days, give it but a little at a Time, for fear of overcharging its Stomach, and after encrease the Quantity. When the Child is grown a little bigger, you may give it either in the Day or Night, as much as it desires, a little and often; for if it take too much at a time, it vomits it up, the Stomach being too weak to digest it. But if you can govern the Child, it would be better to give it the Breast but once every two Hours, and never in the Night-time, unless when it wants Sleep.

After the Child has been fed the first two or three Months with the Breast-milk only, you may give him a Pap made of Flour and Milk, though but little at first, and not too thick neither, lest his Stomach be overcharged. That this may be easier of Digestion, put the Meal in an Earthen Pan into

an Oven, as ſoon as the Bread is Drawn, ſtirring it often to dry it Equally. Pap made thus, is much better than the common Way; for being made with raw Flour, it is very difficult to boil it well, without conſuming the beſt part of the Milk, leaving the thickeſt part behind, which by its long boiling loſes its Goodneſs. When the Child has taken Pap thus made, which muſt be but once a Day, (eſpecially in the Morning) or twice at moſt, the Nurſe may give it Suck to waſh it down into the Stomach, and dilute it there.

If a Pap be given to a Child newly Born, as ſome Women indiſcreetly do, it cauſes Obſtructions, difficulty of Breathing, Gripes, ſwelling of the Belly, and Convulſions; of all which Death is the Reſult, and therefore it is beſt to forbear the three or four firſt Months, provided the Nurſe do not want Milk.

When the Child has ſucked its Fill, let the Nurſe lay it to Sleep, not in the ſame Bed ſhe lies in her ſelf, for fear of over-laying it, but in a Cradle cloſe by her Bed-ſide, and let her put a Mantle over the Head of the Cradle, to prevent Duſt falling on its Face, and the Day-light, Sun-ſhine, Candle, or Fire in the Chamber from offending it; let her lay it to Sleep, on its Back, with its Head a little raiſed upon a Pillow, and to make it ſleep the ſooner, let her rock gently with an equal Motion, without too great Shaking; but that ſhe may not be forced thus to rock the Child every time ſhe would have him to go to Sleep, it is beſt not to uſe him to it at firſt. He may ſleep at any time in the Day or Night, and ordinarily the better he is, the more he Sleeps; however, if he exceeds in this reſpect, let his Nurſe carry him in her Arms to the Light, ſing ſome little Song to him, ſhew him ſome glittering Thing, or dance him in her Arms.

When he is in the Cradle, let it be ſo turned that the Light may be directly in his Face, that he may not be tempted to look aſide; for doing ſo often, his Sight will be Perverted, and he become Squint-eyed. But the beſt way is to let him ſee no Light at all.

The Nurſe muſt open and change the Child, at leaſt twice or thrice a Day, and ſometimes in the Night too, if it be neceſſary to cleanſe him from his Excrements, and ſhift the Blankets, which muſt be put into a Bucking-Tub, and not ſlightly waſhed, as moſt hired Nurſes do; becauſe there comes a certain Salt from the Excrements which inſinuates it ſelf into them, and cauſes a great Itching, Smarting, and Excoriation of the Child's Body.

The Child muſt always be opened before the Fire, and his Blankets and Clouts well warmed and dryed, before he be put into them, leſt their cold and dampneſs, cauſe Cholick and Gripes. The Nurſe muſt put Rags behind his Ears, and under his Armpits, to dry up the Moiſture. During the firſt four or five Days, ſhe muſt be careful not to make the remaining part of the Navel-ſtring fall off too ſoon, before the Veſſels be cloſed, and every time ſhe opens the Child, ſhe muſt ſee whether the Navel for want of being tied faſt do not Bleed; and after the end is fallen off, let her ſtill for ſome time Swathe the Navel, continuing to keep a Compreſs on it till it be well Cicatrized, and ſomething ſunk in. Beſides this let her put upon the Mold of the Head, under the Biggin, another Compreſs to keep the Brain Warm, and prevent the Child's taking Cold. Let her alſo be very careful not to ſuffer the Child to cry too much, eſpecially at firſt, leſt the Navel be protruded outwards, and cauſe an *Exomphalos*, or a Rupture in the Groin. The beſt way to quiet him is to give him the Breaſt, and to lay him Clean and Dry, and preſent ſomething to amuſe and pleaſe him.

Some fooliſh Nurſes uſe to ſuck the Child's Breaſt, to draw out the Seroſities, and form a Nipple in Girls, but this is a ridiculous Practice; it ſuffices in this caſe to apply Rags dip'd in *Oil of Roſes* and *Vinegar*, and forbear ſwathing the Part too Strait.

Of the Weakneſs of New-born Children.

Children ſometimes ſuffer ſo much by a bad Labour, that it is difficult to know whether they are alive or dead, not any part of their Body having the leaſt ſenſible Motion, and being as Blue and Livid, eſpecially in the Face, as if they were Choaked. However, you may be aſſured a Child is alive; if laying the Hand upon the Breaſt you feel the Motion of the Heart, or touch

ing the Navel-ſtring near the Belly, a ſmall Pulſation of the Arteries may be perceived.

The beſt help in this caſe, is to lay him ſpeedily in a warm Bed and Blanket, and carry him to the Fire, and there let the Midwife ſup ſome Wine and ſpout it into his Mouth, repeating it if there be Occaſion; let her lay Rags dip'd in warm Wine to the Breaſt and Belly, and let the Face be uncovered, that he may draw breath the eaſier, let her keep his Mouth open a little, and cleanſe his Noſtrils with ſmall Linen Tents dip'd in White-wine.

Of Contuſions or Bruiſes of a New-born Child.

Children frequently receive Bruiſes on the Head in their Birth, and ſometimes have a Knob near as big as an Egg, eſpecially if the Mother be in Years, and it be her firſt Child, becauſe the inner Orifice of the Womb is Callous, and cannot be dilated without great Difficulty, and the Midwife ſometimes does much miſchief by handling it too roughly.

Theſe Tumours are often ſo large, that they hinder the Artiſt from diſcovering which part Preſents, and often times make them think it is the Shoulder which they feel: But this Errour is eaſily diſcerned, becauſe theſe Tumours though feeling fleſhy, are notwithſtanding harder than any Shoulder or Buttock of a Child, which parts are always ſoft and without Hair, as the Head hath; beſides the Bones may eaſily be perceived, if the Finger being anointed with Oil or freſh Butter, it can be introduced into the inner Orifice, for the Parts within the Womb are not Swelled. If a Child comes with any part beſides the Head, and they remain a long time preſs'd in the Paſſage, they will ſwell likewiſe.

The beſt way to prevent theſe ſort of Tumours, is to procure a ſpeedy Delivery. To this end greaſe well the Internal Orifice of the Womb to relax it, and diſpoſe it to give way for the Paſſage of the Child; and as ſoon as the Child is Born, foment the Tumours with *warm Wine*, or *Spirit of Wine*, and lay Compreſſes dip'd in the ſame on them; ſome Midwives only dip a Compreſs in *Oil* and *Wine* beat together. If a Tumour will not be diſcuſſed by this means, but comes to Suppuration, the Matter muſt be let out as ſoon as is poſſible, for fear it corrupt the Bones of the Head; In this caſe it muſt be opened with a Lancet, and an Emplaſter of *Betony* applied on the Wound. If it be any other Part than the Head which is Swoln, let it be wrap'd in Compreſſes dip'd in a Decoction of *Provence Roſes*, *Camomil Flowers*, and *Melilot*.

Some Male Children have the *Scrotum* very much ſwelled, which may proceed from a Contuſion or Waters contained in it. In both theſe caſes, Compreſſes dip'd in Wine, with *Roſes* boil'd in it, muſt be applied.

The greateſt Miſchief is, when by the badneſs of the Labour or unskilfulneſs of the Midwife, a Leg or Arm is broken or diſlocated; if this happen a Surgeon muſt be called, and the part dreſs'd after the ſame manner as in grown Perſons, having regard to the Weakneſs and ſoftneſs of the Bone.

Of the Mould and the Sutures of the Head being too open.

Very often Children who come before their time, have the Mould of their Head, and the Sutures open. This ariſes from the diſtance and ſeparation of the Bones from one another, which are not Steddy, but may be moved to and fro, and yield on every Side. When this happens, you muſt not think to bring the Bones together by binding the Head Strait, for this would preſs the Brain which is very Tender, and kill the Child. It is ſufficient to bind them ſoftly with a ſmall Croſs-cloth, to prevent the inconvenience of their being unſteady, and commit the reſt to Natures Work, which in time will unite the Bones.

There are ſome Children which have the Mould open till they are three years old more or leſs, according to their Strength. In this caſe, 'tis convenient to cover the part with a Linen Cloth three or four times double to prevent taking Cold, and to defend the Brain from external Injuries.

It happens ſometimes, that although the Bones be big enough to unite in all Parts; yet they are ſeparated from each other in the place of the Sutures, by a quantity of Waters contained between them and the *Dura*

Mater, and ſometimes between the Skin and the *Pericranium*, or the *Pericranium* and the Skull, and ſometimes in the *Sinus* of the Brain it ſelf. If the Water is contained between the Teguments and the Bones, and the ſwelling be not very Large, the Child may be cured by opening and evacuating the Waters, or diſcuſſing them.

Of Gripes and Pains in the Belly of a young Child.

Many Children are ſo griped, that they cannot forbear crying out Night nor Day. This is the firſt Diſtemper which happens to them, and they often die of it.

The principal cauſe of theſe Gripes, is the *Meconium* which is contained in their Guts, which by its long ſtay there grows Sharp, and pricks their Membranes, or becoming Hard, the Infant cannot void it, nor the new Excrements, which proceed from the Milk which he firſt Sucks. It ſometimes happens becauſe the Child not being able to Suck with eaſe, he ſwallows in ſucking the Milk with Difficulty much Air and Wind, which being retained in the Stomach, and ſliding into the Guts does diſtend them, and cauſe a great deal of Pain.

This Wind is ſometimes cauſed by a Child's taking a greater quantity of Milk than he can Digeſt, or the Woman giving her Breaſt-Milk ſoon after Labour, before it be Purified, or perhaps becauſe the Child has taken Cold. Very often theſe Gripes proceed from giving him Pap too ſoon, or not well Boiled; becauſe this is Groſs, Viſcous, and apt to engender Wind in the Stomach. Worms ſometimes by their ſtirring and biting, do very much torment Children. In the laſt place, the Midwife may have cauſed this by forcing back the cold and clodded Blood out of the Navel-ſtring before it be tied.

To avoid theſe Pains, the Nurſe muſt avoid giving the Child Suck till the next Day, leſt the Milk mix with the Excrements, and ſo corrupt and grow ſowr, encreaſing the quantity by little and little, till the Child be uſed to this ſort of Food. If it be the *Meconium*, which by its long ſtay cauſes theſe Pains, give them at the Mouth a little *Oil of ſweet Almonds*, or *Syrup of Roſes*, and put a Suppoſitory made of *Bete* Stalks in the Fundament, or a *Sugar Almond* dip'd *Honey*, or a ſmall Clyſter.

If the Child cannot ſuck, and this proceed from its being Tongue-tied, the *Fr num* muſt be cut in the Manner ſhall taught in its proper Place; and if the Nu be hard milch'd, change her for another.

Whilſt the Child is griped, give it Pap; becauſe this Food does create O ſtructions, breed Wind, and often ca Convulſions.

If the Gripes proceed from Worms, la Cloth dip'd in *Oil of Wormwood* mix'd w *Ox Gall* on the Belly; or a ſmall Catapla made with Powders of *Rue*, *Wormwood*, C *quintida*, *Aloes*, and the *Seeds of Citrons*, corporated with *Ox Gall* and Flour of *L pines*; and if it can take any Thing by Mouth, give it a ſmall Infuſion of *Rhub* or half an Ounce of *compound Syrup of S cory*, having before given it a ſmall Cly of *Milk* and *Sugar*.

When theſe Gripes are cauſed by Wi or any ſharp Humours in the Guts, ano the Child's Belly all over with *Oil of ſ Almonds*, or *Oil of Walnuts*, *Camomil*, *Melilot*, mixed together, (having firſt warm them) in which alſo a Cloth may be di to lay upon it; or a ſmall Pancake may made with an *Egg* or two fried in *O Walnuts*, and applied to it; or you may g the Child a little Anodyne or Carminat Clyſters, as Occaſion requires, ever keepi him very warm.

Of the Inflammation, Ulceration, Shoo forth or Rupture of the Navel of a yo Infant.

If the Navel-ſtring fall off before it be tirely cloſed and cicatrized, there happ an Inflammation, and Ulceration at o times. Although it be outwardly hea yet not being ſo within, it is dilated, protruded out till the Tumour be as bi an Egg, which is called an *Exomphalos*. proceeds from the continual Cries of Child, or ſome violent Cough.

In this Caſe, endeavour by all means appeaſe the Child's Cough, and quiet prevent its continual Crying, without w the Tumour would daily increaſe. If Chi

Child's Uneaſineſs proceed from the Gripes, they may be remedied in the Manner above directed. If the Navel be inflamed, apply Baden's *Cerate* mixed with a Moiety of *Populeon*, or a ſmall Compreſs dip'd in a Mixture of *Oil of Roſes* and *Vinegar*, or *Unguent of Roſes* with *Album Rhaſis*.

When the Ligature is come away, and the Navel is ulcerated, apply Deſiccatives and Aſtringent Medicines, as Rags dip'd in *Lime Water* which is not too ſtrong, or *Plantane Water*, with a little *Allum* diſſolved in it. If the Ulcer be very ſmall, lay on it a little Pledget of dry Lint: Some add a little Powder of a rotten Poſt. Theſe Medicines are better than Emplaſters, which are never ſo drying, by reaſon of the Greaſes and Oils in their Compoſition. *Ceruſs Emplaſter*, or *Deſiccativum rubrum*, or *Diapompholygos*, are the beſt; in applying which, you muſt obſerve to lay a Compreſs of Rags, and keep it on by ſwathing the Part, till the Navel be entirely formed; for the Child, by its crying, breaks the Veſſels, or cauſes an *Exomphalos*.

As to the Rupture of the Navel in young Children, the Cure of it muſt not be undertaken otherwiſe than by Swathes and Compreſſes fitted for the purpoſe, at leaſt till ſuch time as they are grown to a competent Bigneſs; and then if theſe do not effect the Cure, you may perform the Operation.

If after the Inflammation there enſues an Apoſtem, the Child moſt commonly dies; for if it be opened to diſcharge the Matter, the Guts protrude themſelves out as ſoon as the Child begins to cry. If the Surgeon be ſollicited to make the Operation, let him deliver his Prognoſtick, that ſo the Child's Death, if it ſhould ſo fall out, may not be imputed to him.

But if the Apoſtem be ſmall, and the Child has Courage and Strength enough to endure it, let him open it a little, which poſſibly may free the Child from this Inconvenience.

Of the Smarting, Redneſs and Inflammation of the Groins, Buttocks and Thighs of an Infant.

If the Nurſe does not keep the Child very clean, the Acrimony of the Excrements will not fail to cauſe a Redneſs and Smarting, and Inflammation of the Groins, Thighs and Buttocks: She muſt therefore keep it very cleanly, uſe a cooling Diet her ſelf, and refrain from all Things which are apt to heat the Blood, that ſo the Heat of the Child's Water may be allay'd. Let her bath the Part inflamed with *Plantane Water*, adding a fourth Part of *Lime Water*: Or, if the Pain be very great, foment it with lukewarm *Milk*. Many Women uſe *Powder of a rotten Poſt*, or a little *Mill Duſt*, which they ſtrew on it. *Album Rhaſis*, or *Diapompholygos* ſpread on a Rag in form of an Emplaſter, is not amiſs; but the beſt of all is a Lotion of *Saccharum Saturni*, the Effect of which may be ſeen in an Hour after. When the Nurſe opens the Child, let her be careful to wrap the inflamed Parts with fine white Rags, that they may not, by rubbing together, be more galled and pained.

Of Ulcers or a Thruſh in the Mouth of a Child.

Very often the Milk of a Nurſe that is red-hair'd, addicted to Drinking, or very amorous, by its Heat and Acrimony, cauſes ſmall Ulcers in a Child's Mouth, which are called *Aphthæ*, and ſometimes Cankers. Some of theſe are ſimple and ſuperficial, and are cured with much Eaſe: Some again are ill-conditioned, and cauſed by a pocky Venom, and happen after malignant Fevers, or are ſcorbutick and putrid: Theſe ſpread themſelves to the Throat, make deep Eſcars, and often are mortal to Children, becauſe they want Strength to undergo the Cure.

To cure Ulcers in the Mouth, you muſt take care to allay the Heat of the Nurſes Milk, preſcribing her a cooling Diet, (and bleeding and purging her, if ſhe be plethorick) and waſh the Child's Mouth with *Barley* or *Plantane Water*, and *Honey of Roſes*, or *Syrup of dry Roſes*, mixing a little *Verjuice*, or *Juice of Citron*, to deterge the viſcid Humours, and cool the Mouth. For this purpoſe, faſten a dry Rag to the End of a little Stick, and dip this in any of the abovementioned Medicines, apply it gently to the ulcerated Part, to prevent the Inflammation from being increas'd by a violent Rubbing. During this, the Child's Body muſt be kept open.

If

If the Ulcers participate of any Malignity, let ſuch Topicks be applied as will have a prompt Effect. For this purpoſe, touch them with *Plantane Water* ſharpen'd with *Spirit of Vitriol*, taking care to prevent the Child from ſwallowing it. The Remedies muſt be ſo much ſharper and ſtronger, as the Ulcers are deeper and more malignant. As ſoon as they are cauterized with this Water, let the Child's Mouth be waſhed with a Decoction of *Barley*, *Agrimony*, and *Honey of Roſes*; or touch them with the ſame as often as you ſhall think convenient, at leaſt till a Stop be put to their ſpreading. Some rather chuſe to cauterize theſe with ſmall Tents of *Rags* dip'd in boiling *Oil*; becauſe they apprehend, if the Child ſhould ſwallow them, that they could not in the leaſt prejudice it. It will not be amiſs to purge off the ill Humours in the Child's Body, by giving him a little clean *Caſſia* or *Syrup of Succory* with *Rhubarb*. If the Ulcers are venereal, theſe Remedies will have little Effect.

Of the Pain and other Accidents in breeding the Teeth.

The breeding of Teeth is the Cauſe of a great many Accidents, and often proves fatal to Children. In the time of their cutting, they are troubled with Inflammations of the Gums, Fevers, Convulſions, Looſeneſſes, eſpecially when the Dog or Eye Teeth cut, and the Child is large, full of Humours, and coſtive.

When the Teeth cut, the Gums and Cheeks ſwell, there is great Heat and Itching, which often makes Children put their Fingers into their Mouth to rub them, from whence ſome Moiſture diſtils down into the Mouth, becauſe of the Pain they feel there; the Nurſe, in giving them ſuck, finds the Mouth hotter; they are very much changed, and cry every Moment, and cannot ſleep, or but very little; and ſmall Points of the Teeth may be ſeen and felt through the Gums, which appear thin and pale on the Top, and red and inflamed on the Sides; and if it happens to be a long time e'er they cut, or that too many of them cut at a time, the Pain is ſo exceſſive, that it ſometimes kills the Child.

To prevent theſe Accidents, the Nurſe muſt keep a good Diet, and uſe all Things that may allay the Heat of her Milk, fear of putting the Child in a Fever, w already is very much in Pain; and let Body be kept open with Clyſters, if he bound.

To help the cutting of the Teeth, let t Nurſe from time to time paſs her Fin over the Child's Gums, gently rubbi them; and give him a Stick of Liquorice champ, or a little End of a ſmall new W Candle, which is very good to ſoften t Gum; or a ſilver Coral, with ſmall Bel to divert him from thinking on the Pain feels. Some Women, inſtead of a Coral, p a Wolf's Tooth in. If the Gums are ha and thick, theſe Things do no good: So Nurſes make an Inciſion with their Na but 'tis better done with a Lancet, becau that is not ſo painful, and makes no Co tuſion.

If the Pain in cutting of the Teeth cau Convulſions, open the Gum with an Inc ſion-knife, going ſo deep till you feel t Hardneſs of the Teeth with the Inſtrumen keep the Child's Body open, forbear givi him Pap, anoint his Belly with ſome Purg tive Syrup, and the hinder Part of his Ne with *Oil of Lillies*, and let the Nurſe obſer a good Diet.

Of a Looſeneſs in Children.

Children being wholly fed with Liquid the Fibres of the Stomach are relaxed, whic is apt to cauſe a perpetual Looſeneſs. Thi often happens by reaſon of the great Pai which attends the cutting of the Teeth, an ſometimes from the Sharpneſs of the Mil which irritates the Guts.

A Looſeneſs which is of no long ſtand ing, and without a Fever, is not to be ac counted dangerous; but if it continue lon it will be convenient to put a ſtop to it, fo fear the Child be too much weaken'd by i For this purpoſe, let him ſuck well purifie Milk, giving but a little at a time, to the en he may the better digeſt it; give him an In fuſion of *Rhubarb*, to purge away the ill Hu mours. Gentle Anodyne Clyſters may b likewiſe given, with *Milk*, *Yelks of Egg* and *Honey of Roſes*; but after Purging, l them be made with *Plantane Water*. Yo may likewiſe mix the Yelk of an Egg in th Pa

Pap he eats, rub his Belly with *Oil of Quinces*, and lay upon his Stomach Compreſſes dip'd in Red Wine, in which *Provence Roſes* have been boiled.

Of Vomitings.

Vomiting in Infants is frequently the Occaſion of other Diſtempers, if it proceeds too far. It moſt commonly proceeds from their drawing more Milk than their ſmall tender Stomachs can retain and digeſt. Sometimes the Badneſs of the Milk, the Nurſes dancing the Child too much, a violent Cough, or too great a Compreſſion of the Stomach, are the Cauſes of this Accident; to all which the Sweetneſs and Lukewarmneſs of the Milk contribute much.

When the Child ſucks more than it ſhould, the Nurſe muſt not give it ſo much, and but a little at a time. If the Milk be bad, let the Nurſe be changed for a better; if the Vomiting be cauſed by a Cough, ſome proper Remedies muſt be uſed to appeaſe it; if by the dancing of the Child, the Nurſe muſt forbear ſhaking it ſo rudely; if from a Compreſſion of the Belly, Care muſt be taken that it be not ſwathed ſo ſtrait. If there be any ill Humours in the Stomach, it will be convenient to purge the Child with a gentle infuſion of *Rhubarb*, or half an Ounce of *compound Syrup of Succory:* And after this, if judged neceſſary, it may take a little *Syrup of Quinces*; and Compreſſes dip'd in an Infuſion of *Provence Roſes*, *Cinnamon* and *Cloves*, in *Red Wine*, may be laid on the Stomach.

Of Ruptures in Children.

The moſt frequent Cauſes of this Accident are their vehement Crying and violent Coughs: Beſides, the Moiſture and Softneſs of their Bodies do not a little contribute to it. In the laſt Place, too ſtrait Swathing by forcing down the Guts often cauſes Ruptures.

This Miſchief muſt be remedied as ſoon as diſcovered, becauſe the continual Deſcent of the Gut dilates the Place through which it falls every Day more and more. Ruptures in Children are more eaſily cured than in grown Perſons.

While Children are in ſwaddling Clouts, the Cure of true Ruptures, which happen to them, muſt not be undertaken but by a Swathe-band, which is ſufficient. This is effected by a Roller, putting a Compreſs or Truſs juſt upon the Rupture, after having firſt reduced the Gut and *Omentum* into their natural Place. To do this, lay the Child with his Head low, then with both Hands reduce them by degrees, thruſting the Tumour with one Hand, and putting in the Gut with the other. After the Guts are reduced, lay a thick Compreſs on the dilated Place, and ſwathe it in the ſame Manner as was directed in the Rupture of the Groin or *Bubonocele*. Becauſe it is very difficult for a Nurſe to make this Bandage, a ſmall Truſs may be uſed inſtead of it, which muſt be waxed, to prevent being rotted by the Child's Water, and more than one muſt be had in readineſs for change. For the better curing the Child, let him be kept in Bed forty or fifty Days, and Care be taken to prevent his Coughing and Crying, and his Belly muſt not be compreſſed. Some foment the Place with *Smith's Water*, and then lay on *Emplaſtrum ad Herniam*.

The *Hydrocele* or *Hernia Humoralis* is a Collection of Waters in the *Scrotum*. To reſolve theſe Tumours, uſe *Spirit of Wine*, or a Fomentation made of a Decoction of *Camomil*, *Melilot*, *Rue*, *Marjoram* and *Fennel*, and apply Compreſſes dip'd in it to the Part; and after this, dry the *Scrotum* with a Solution of *Allum* in *Lime Water*; and to ſtrengthen the Part, lay Compreſſes dip'd in a Decoction of *Roſes* and *Allum* in *Red Wine*.

If theſe Remedies are ineffectual, make an Aperture with the Lancet to evacuate the Waters.

Of Scabs upon the Head and Face of young Children.

Theſe are ſeldom malignant; and it is a Mark that they are not ſo, when they are only ſuperficial, moiſt and yellow; and when their Cruſt is removed, the Skin appears of a red florid Colour, without any notable Ulceration.

The Humours muſt never be repelled, becauſe the Diſcharge they make is uſeful to preſerve the Body from ill Diſtempers, and the Child ever has its Health beſt when they come out. However, to prevent the breeding of ill Humours, take care that the Nurſe be-

be a Sound and Healthy Woman, keep the Child's Body Open, and purge it now and then with a little Syrup of *Roſes* or *Succory*. The cruſt muſt be digeſted and brought off, to give the Matter a better Iſſue; for which purpoſe you may make uſe of freſh Butter, or *Oil of ſweet Almonds*, laying on a *Cabbage* or *Beet Leaf* after, which muſt be renewed twice or thrice a Day, to avoid the offenſive Scent. Continue the uſe of theſe Remedies till the Child be Cured, ever endeavouring to procure a plentiful diſcharge of Matter, after which Nature will finiſh the reſt of the Cure. In the mean time, keep the Child's Hands tyed to prevent his ſcratching his Face, which would inflame it more, and bring down a Flux of Humours.

Of the Small-Pox and Meazles in Children.

The Small-Pox is a Diſeaſe in which abundance of ſmall Puſtles do break out all over the Body, which grow White, and after Ripen. The Symptoms of the Small-Pox and Meazles are ſo very like, that it is difficult to diſtinguiſh them on the firſt, ſecond, or third Day.

The Signs which precede the Eruption of the Pox are a Fever, *Stupor*, a great Beating and Pain of the Head, Laſſitude, a Pain in the Back, Sickneſs, Vomiting, Difficulty of Breathing, Yawning, Sneezing, Itching of the Noſe, Inflammation of the Eyes, a general wearineſs of the whole Body, and a Urine very Turbid. As for the Eruption upon the third or fourth Day, a great many ſmall Puſtles ariſe, which encreaſe in bigneſs and number till the eighth or ninth Day; at which time they grow White, and gradually Ripen; and the Face and Head Swell, the Eyes are cloſed by the diſtention of the Eye-lids, the Noſe is ſtop'd, the Voice grows Hoarſe, there is a dry Cough, a Pain in the Throat, and a great difficulty of Breathing; if there be abundance of Puſtles, the whole Body is Swoln.

There is a ſort of Small-Pox void of Malignity, this at firſt is attended with a Fever, which ceaſes immediately after the Eruption, the Puſtles riſe to a Point, ſuppurate kindly, and are ſoon Well. The Matter is White, Uniform, and well Digeſted: When the Diſtemper is Malignant, the Puſtles are Brown, Flat, Livid, or ill Coloured, ha little black ſpots in their middle, break o more ſlowly than when they are Kind, ha no Digeſtion at all, or at leaſt a very b one, are filled with a Sanious Matter, tended with a Malignant Fever, *Delir* difficulty of Breathing, *Syncope*, and Dyſ teries; ſometimes they leave behind th Malignant Ulcers, Caroſity of the Bon loſs of Sight, Deformity of the Face, Lameneſs of ſome Limb.

If the Fever be not very High, and ab in proportion to the Eruption of the P ſtles, if they be not very Numerous, a grow White, and ripen quickly, the ſtemper is not very dangerous; but if contrary happen, it is a ſign of Death. Small-Pox in Children, is not ſo danger as in grown Perſons, becauſe their Ski more Soft and Porous, ſo that they br out more kindly than in thoſe who have Skin more Compact, and the Pores no Open.

The Meazles are never ſo dangerous as Small-Pox, becauſe the Peccant Matter T ſpires more eaſily and quickly. Theſe moſt commonly over in three or four D after which the Pox ſometimes app which occaſions the one Diſtemper to be ſtaken for the other.

For the more ſucceſsful curing this ſtemper, preſcribe the Child a good D let her forbear all ſolid Meats, and feed ly on Liquids; ſuch as Veal or Chi Broth, or a little Gelly. Let him dri Ptiſan of *French-Barley*, Roots of *Dog-g Liquorice*, and *Raiſins of the Sun*. Never Pap to a Sucking Child, till it be fectly Recovered, and let the Nurſe k cooling Diet. Do not ſuffer her to her Child into the open Air, but le keep it cloſe in the Chamber, neithe Hot nor too Cold; for too hot an Ai ſipates the Spirits, and too cold an one the Pores, hinders Tranſpiration, and d the Eruption. The Child's Sleep mu Moderate, and his Belly kept Open. Small-Pox be attended with a High Fe the beginning, together with a difficu Breathing, and other like Symptoms ing is neceſſary. Purging in the begi of the Small-Pox is not to be admitte fear of turning the Courſe of Hu

which tend toward the Skin, but after it is proper to evacuate the remaining Impurities.

From time to time to give the Child all ſort of Cordial and Strengthning Things, ſuch are a pure Air, good wholſome Food, Juice *of Oranges*, Syrup *of Limons*, and *Pomgranats* in the Ptiſan, or a little Wine allay'd with Water, but if it be a ſucking Child, Milk muſt ſerve in ſtead of all other Cordials.

As ſoon as the Puſtles begin to appear, anoint them with Oil of *ſweet Almonds*, rubbing them with a Feather dip'd in it. Some uſe *Cream*, *freſh Butter*, or *ſtale Lard*, melted and waſhed in *Roſe-water*, and beaten up in a Marble Mortar, and with this they greaſe them till they are perfectly Cured. When the Puſtles are ripe, which may be known by their Whiteneſs, and Itching, which uſually is about the ninth Day, the biggeſt of them may then be pierced (by a Gold or Silver Needle, or by cutting the tops with a pair of Sciſſars) to diſcharge the Matter, leſt by its too long ſtay it ulcerate and corrode the Part too deeply. Afterwards to dry them up, anoint the Face with a Liniment made of freſh *Cream*, mixed with *white Chalk*, continuing this Remedy till the Scabs be quite fallen off, uſing it Night and Morning, or make uſe of *Ointment of Roſes*, with a little powder'd *Ceruſs* mix'd with it.

To prevent the Small-Pox from cauſing too great a Defluction on the Eyes, apply cooling Remedies, as *Roſe* and *Plantane-water* from the beginning; Breaſt-Milk is very good to bath the Eyes with; Let the Nurſe from time to time unſtop the Child's Noſe, that ſo he may breath with more Eaſe. Give him ſometimes a little Syrup of *Violets* to ſmoothen his Throat, or give him a little Syrup of *Limons* or *Pomgranate*, but Milk alone is ſufficient for a ſucking Child.

How to cure the Venereal Pox in Children.

If the Mother have the Pox when the Child is born, it will infallibly be infected by her; and this may be eaſily diſcovered when it is ſo, by Puſtles and Ulcers, in all parts of the Body, eſpecially in the Belly, Funament, Head, and between the Legs.

If the Nurſe who gives it Suck be Poxed, ſhe will communicate it to the Child with her Milk. In this caſe, the Diſtemper firſt appears in the Child's Mouth, and the ſharpneſs of the Milk makes ſeveral Ulcers in it. But we muſt not preſently conclude the Nurſe has the Pox, becauſe the Child has Puſtles in ſeveral parts of its Body, for theſe ſometimes proceed from the Milk being overheated, and therefore ſome other Symptoms muſt be look'd for before you can be aſſur'd of it.

There is nothing farther neceſſary for the cure of ſimple Puſtles, than changing the firſt Nurſe, and giving the Child to another whoſe Milk is Sweeter, and who will take care to keep it Clean. But Children who come into the World with the Pox on them, moſt commonly die of it, and thoſe who receive it from their Nurſes, are very difficultly Cured, their tender Age being unable to ſupport the Fatigue of Medicines.

If the Nurſe be Poxed, take the Child from her and give it to one who is Sound, who muſt be confined to a cooling Diet. Let the Nurſe waſh her Nipple with Wine every time ſhe gives the Child Suck, and let her Purge from time to time, for fear of being Infected. If no Nurſe can be found who will venture to ſuckle the Child for fear of being infected her ſelf, take one who has abundance of Milk, and let her ſqueeze her Breaſt and drop it into the Child's Mouth, or let her Milk her Breaſt into a Porringer, and give it a Spoonful now and then, or let her put her Milk into a Funnel, at the end of which there is faſten'd a Rag rowl'd up, and put this into the Child's Mouth for him to Suck, or dip Rags in her Milk, and let him ſuck them. But the beſt way is to let him ſuck a young Goat, fed on purpoſe with good Hay, and other convenient Things.

Let the Child be Bled and Purged, and after if he have Strength enough, anoint him with a Mercurial Ointment, rubbing only the Puſtles and Ulcers, in doing which and reiterating the Frictions a ſmall Flux will be raiſed by degrees, which muſt be almoſt inſenſible, leſt the Humours being ſtirred and carried in too great abundance to the Mouth, cauſe it to Swell and Ulcerate,

and hinder the Child's Sucking: Wherefore but a ſmall quantity of Mercury muſt be mixed with Ointment, and after one Friction or two, you muſt forbear five or ſix Days, and ſee how the Flux will Riſe, and then if there be occaſion, give a few Grains of the Mercurial *Panacea* in the Child's Pap. Let the Nurſe waſh its Mouth with a Lotion of *Barley Water*, with the addition of *Honey of Roſes*, or *Syrup of Wormwood* with *White-wine*, to clear it from the Froth which is uſually gathered about it, and that he may void the Drivel better, let him lie upon his Side, and not upon his Back, leſt falling upon the Stomach, or upon the Lungs, it ſhould choak him. Let him be always kept warm without carrying him into the Air, and watch diligently the effects of the Medicine.

The common way to make this Mercurial Ointment, is thus; take half an Ounce of *Quick-ſilver*, paſs it through a Leather to clear it from its adhering Filth, and then mix it in a Mortar with four Ounces of *Hog's-greaſe*, till it be very well incorporated; then take two Drams of this Ointment for each Friction, more or leſs in proportion to the Child s Strength.

How to chuſe a good Nurſe.

The Mother is doubtleſs the beſt Nurſe that a Child can have, if there be no reaſon to the contrary. The beſt Age for a Nurſe, is from 25 Years to 35, becauſe about that time a Woman is ſtronger and more healthy than at any other. The common Opinion is, that a Woman is moſt fit to be a Nurſe, two or three Months after her Delivery, becauſe at that time the Milk is Purified, and her Body purged by her Cleanſings, but ſhe cannot be ſo much longer, becauſe in this caſe the Milk would not continue ſo long, as would be neceſſary to ſuckle the Child. She muſt not have Miſcarryed, but had her Child at due time. The Milk of a Woman who has been Delivered of a Male Child, is commonly thought to be beſt, and it is to be preferred if it be her Second Child, becauſe ſhe may then very well be ſuppoſed to have ſome Experience in the Ordering and Managing her Infant. *Mauriceau* prefers Milk of a Fortnight Old, to that of three or four Months, and if it be for a Girl, he prefers a Nurſe who has a Girl, to one who has had a Boy.

She muſt be Sound and Healthy, and born of Parents who were ſo, and never had the Stone, Gout, Kings-Evil, Falling-Sickneſs or any other Hereditary Diſtemper. She ought to have a clear Skin free from all Scabs, Itch or Scald; ſhe ought to be ſtrong and able to watch and tend the Child as occaſion Requires. It is convenient ſhe be of a middle Stature, neither too large nor too little, too Lean or too Fat; but above all ſhe muſt not be with Child. Let her Complection be Sanguine, and her fleſh Plump and Firm. She muſt not have her Courſes, for that is a ſign her Blood is too Hot, or ſhe is too Amorous; ſhe muſt not have the Whites, for theſe are a ſign of a bad Habit; ſhe muſt not be red Hair'd, or mark'd with any Spots, but her Hair muſt be Black or of a Cheſtnut Brown. She muſt be well Shaped, neat in her Clothes, and handſome in her Face, having a ſprightly Eye, and ſmiling Countenance; ſhe muſt have good Eyes, ſound and white Teeth, and ought to have a ſweet Voice, to ſing to and pleaſe the Child. She muſt have no ill Scent come from her, as uſually red Hair'd Women have, and not thoſe who have black Hair and a white Skin, for their Milk is Hot, Sharp, and of an ill Taſt and Scent; ſhe muſt not have a ſtrong Breath, as they who have a ſtinking Noſe, and bad Teeth, becauſe ſhe would infect the Child's Lungs by often drawing in the corrupted Air.

Her Breaſts ought to be pretty large to contain a ſufficient quantity of Milk; they ought to be pretty firm and plump, and not flaggy or hanging down; for a large ſtrutting Breaſt is the Mark of a good Habit of Body. As for the Nipples they muſt be well Shaped, not too big nor hard, nor callous, nor ſunk in, but they muſt be raiſed, and have ſeveral ſmall Holes that the Child may ſuck without any great Pains; ſhe muſt have Milk ſufficient, and not in too great Exceſs, becauſe the Child not being able to draw it, it grows ſtale in the Breaſt, and by its long ſtay there, turns ſowr and curdles; and therefore ſhe may let another Child ſuck the Remainder. Her Milk muſt not be too thick nor too wateriſh, which

may be known by milking it into the Hand, and the turning it a little on one Side; for if it run off immediately, it is a ſign it is too Fluid, but if it do not run off at all, it is too Thick; the good is of a conſiſtence between both, which runs off gently in proportion to the inclining of the Hand, and leaves a Trace behind it. The whiteſt Milk is the beſt, and the farther any recedes from that the worſe it is, it ought to have a pleaſant Smell, and ought to be well taſted; that is, ſweet and ſugar'd, without any Acrimony or Heat. But we muſt not forget one principal Condition of a good Nurſe, and that is, that ſhe be an honeſt and conſcientious Woman, becauſe theſe qualities will make her ſober and careful of her Charge, and preſerve her from Drinking and Venery.

How to prevent Childrens growing Squint-eyed, Awry, Crooked or Lame.

To prevent a Childs becoming Squint-eyed, chuſe a Nurſe whoſe Sight is firm and ſtreight, leſt by her ill Example, he get a bad Habit, Children being wondrous apt to imitate what they ſee done. Let his Cradle be ever ſo placed, that he may always have the light before him, becauſe when it is on one ſide, the Muſcles of the Eye are kept to act independently on one another. To redreſs this Inconvenience, let the Child wear a Mask upon its Face with two ſmall Holes right againſt the Eyes to ſee through, which will cauſe him perceiving no Light but through them to direct his Eyes that way, and by degrees quit the ill Habit he has got of looking aſide.

To prevent the Child's growing Crooked, Awry, or Lame, the Nurſe muſt ſwaddle his Body Strait, equally extending his Arms and Legs, and ſwathing his Body ſometimes one way, ſometimes another, leſt if ſhe ſhould ſwaddle it always alike, the parts would retain an ill Figure. The Nurſe muſt lay him on his Back Streight, and not bend him, and when ſhe holds him in her Arms, muſt her carry him ſometimes upon one, and ſometimes upon another, for holding his Legs always in the ſame Faſhion, it would be a great Hazard if they did not grow Crooked, and this Compreſſion, eſpecially about the Knees, is the cauſe why ſo many Children have crooked Legs.

When any Parts have contracted an ill Figure, from whatever cauſe it proceed, let this be remedied with Swathes and Compreſſes conveniently placed, to keep the Part in a good Poſture, whilſt the Child is in his Clouts. When he is grown a little bigger, ſmall Leather Boots may be uſed to ſtreighten the Legs; if the Foot only be awry, Shoes underlaid of one ſide higher than the other, will ſerve the turn. When the Breaſt or Back-bone are in fault, it muſt be helped if poſſible, or at leaſt hinder'd from growing worſe, by a little Bodice of ſtrong Whale-bone very well lined on that ſide where it jets out. A Croſs made of Steel is now in uſe, the traverſe of which paſſes over both Shoulders, and the perpendicular lengthways of the Body, this Inſtrument is very convenient, and does not appear.

Thoſe who would ſeriouſly apply themſelves to the Practice of Deliveries ought to have that excellent Piece of the famous M. *Mauriceau* on this Subject ever before them, and read it Day and Night. I dare engage the intelligent Reader will perpetually find new matter in it. This is a Noble, Uſeful and Laſting Monument, from which Poſterity will reap great Advantages

REMARKS.

Mauriceau aſſures us, he delivered a Woman of a Dead Child, which ſhe had retained in her Womb for two Months, after being ſeverely exerciſed with a violent Cough. Though the Child was entirely ſtrip'd of its Scarf-skin; yet it had not the leaſt ill Scent, being kept in this manner from all manner of Cadaverous Putrefaction. The Mother retained it to the end of the ninth Month, without any notable inconvenience, and continu'd in perfect good Health till after her Delivery.

The ſame Author relates, *Obſ.* 465. that on the 21*ſt* of *November* 1686. He laid a Woman nine Months gone with Child of a Girl perfectly Sound; her Burthen appear'd to be Sound, though the Mother had in the Neck of the Womb ſeveral Miliary Puſtles and Yellow Excreſcences, which undoubtedly proceeded from a virulent *Gonorrhœa*,

which her Husband probably had given her above a year before.

Obſ. 422. He relates that on the 25th of *January*, 1686. He happily delivered a Woman of a Male Child, the Child was ſeized with a great Defluxion on the Head, cauſed by a great quantity of cold Water which the Prieſts poured on the Mould in baptizing him. This cold Water created ſo great an Obſtruction, that it could not breath through the Noſe, and therefore was incapable of Sucking, and obliged to quit the Breaſt, as ſoon as it had taken it into its Mouth, and this killed the Child in four days after.

Obſ. 692. He tells us a Woman Miſcarryed of a *Fœtus* wholly Emaciated, which was about the length of a Man's Finger, being about three Months gone, and this was occaſioned by a great clap of Thunder which ſurprized her.

Obſ. 688. This Author mentions a Woman who was delivered at Nine Months end of a Girl very Sound and Well, though the Mother voided near a Quart of Water in one Day, above two Months before, and after voided a conſiderable quantity more at different times. He makes a queſtion whether theſe Waters were the effect of a Dropſie, or were really the Child's Waters, and concludes they could not be any other than a Dropſie, becauſe the Child had been incapable of ſuſtaining ſuch a loſs, and the Woman muſt of neceſſity have been delivered when the firſt Waters came away.

Obſ. 489. He tells us he had laid a Woman of 35 years of Age, whoſe Hymen was entire, and only perforated with a ſmall Hole, ſhe was with Child though her Husband could never break that Membrane, and enter her Body, as ſhe her ſelf aſſured him. This Example makes it evident, that a Woman may become big with Child without introducing the Yard, and that it is ſufficient that the Seed be lodged within the Neck of the Womb.

Obſ. 393. He Remarks, that a Woman of ſixteen years of Age and a half was got with Child though ſhe never had had her Courſes.

Obſ. 20. He tells us that a Woman having had a continual Oppreſſion in the time of her going with Child, was bled four or five times in the Arm, twice in the Foot, onc in the Throat, notwithſtanding which ſh was delivered of a Healthy Child at her du time.

Obſ. 30. He tells us that a Woman o eighteen years of Age, was happily deliver ed at her due time of her firſt Child wh was very well, as the Mother her ſelf wa tho' ſhe had been bled ninety times durin her going with Child, particularly in he eighth Month 22 times in the Arm, an twice in the Foot.

Obſ. 23. He tells us that a Woman of 2 years of Age, and ſeven Months gone wit Child, underwent a Salivation for the cu of a Pox; the Flux was ſo Copious, th ſhe filled five or ſix Baſons every Day. Th Woman was cured of her Diſtemper, an at laſt happily delivered at her due Term of Healthy, Sound Child, which perhaps wou have died of the Pox, if the Woman ha not gone through this Courſe.

Obſ. 40. He relates that a Woman havin a *Prolapſus* of the Womb made uſe of a Pe ſary, who was notwithſtanding got wi Child, though ſhe did never take that Pe ſary out.

Obſ. 70. He tells us that a Woman w had been Hydropical for the ſpace of ni Years, was notwithſtanding Pregnant, a when her time was up, delivered of a lu Child; the Dropſie encreaſed till the time her Delivery, and ſhe had four Childr whilſt her Diſtemper was on her, amon which was a Girl, who appear'd to be ſev years of Age, when ſhe was really not bove four and a half. After her Delive her Belly did not ſink more than if a P let's Egg had been Excluded, and ſhe peared as big as if ſhe had near 30 quart Water in her Belly.

Obſ. 249. He relates that a Woman wh Belly was two Ells of *Paris* meaſure in C cumference, was notwithſtanding got w Child, and delivered ſeveral times when time was up. This Woman in good He weighed 110 Pound, and when ſhe had Dropſie, 220, and yet had her Courſes regularly. This Woman made Iſſues in Legs, whereby all the Water of her B being Evacuated, ſhe dyed within a days after.

Obſ.

Obſ. 105. He relates that a little Woman who had had ſeveral Children, when ſhe was not with Child would often emit wind with as great a Noiſe as from the *Anus*, adding, that he had ſeen ſeveral Women, who though with Child, have been ſubject to the ſame Accidents.

Obſ. 146. He tells us that a Woman at the end of her eighth Month, was delivered of three Children, each of which had a ſeparate Burthen, though the Woman was Paralytick on one ſide of her Body.

In *Obſ.* 174. He relates that a Woman having the *Nymphæ* exceſſively long, which was unpleaſing to her Husband, and incommoded her very much in Riding, but rubbing againſt each other, ſhe cut them off and loſt twelve Porringers of Blood in five or ſix Hours.

In *Obſ.* 223. He mentions a Woman who ſeeing her Husband, return from the Army, with his Head bound up, was deprived of her Senſes by the ſudden Fright, fell into a Flooding, and was delivered of a falſe Conception.

Obſ. 245. A Woman about ſix Months gone with Child being overturned in her Coach, and exceedingly affrighted by the Accident, the Child in her Womb died, and continued there for the ſpace of a Month, notwithſtanding which it was not much Corrupted, being preſerved by the Waters; for if theſe had come away, it muſt of neceſſity have Putrefied.

Obſ. 246. He tells us he had ſeen an Abortive *Fœtus* of five weeks Old, which tho' no longer than his Nail, had all its Parts as perfectly formed, as one of nine Months.

Obſ. 251. He Relates, that a young Woman dying after ſhe had been two days in Labour, not being able to be delivered, the Child which was very Large, preſenting its Head and one ſide of its Face, was opened after her Death, and the Child was found Dead; and though its Head was in the Paſſage, by its ſtrugling it had broke through the Womb, and thruſt the Burthen into the Cavity of the lower Belly.

Obſ. 301. He mentions a Surgeon who cutting the *Frænum* in a Child that was Tongue-tied, opened a Vein which poured out a great quantity of Blood, and this coagulating in the Stomach killed the Infant.

Obſ. 315. He aſſures us he had ſeen a Woman eight Months and a half gone with Child, who having had a very dangerous Pleuriſie about two Months before, was ſeized with a continual Fever and *Delirium*, of which ſhe died after ten days Illneſs. As ſoon as ſhe was Dead, an Inciſion was made into the Womb, and a Child taken out, which lived about two Hours.

Obſ. 342. He mentions a Woman who entirely loſt her Senſes upon hearing of the Death of her Child, about five or ſix Days after her Delivery, who notwithſtanding became Pregnant, and after was happily delivered of another Child, and reſtored to the uſe of her Reaſon.

Obſ. 383. He mentions a Woman of twenty years of Age, who being ſuppoſed by the bigneſs of her Belly to be with Child the firſt time, and about ſix Months gone, had violent Vomitings, which after ſome time were ſtay'd by the bringing up a Worm as long as a Man's Hand; after this ſhe fell into a Hectick Fever, and continual Looſneſs, with which being very much waſted ſhe died. Upon opening the Body, the left Teſticle was bigger than a Man's Head, and filled the whole Capacity of the lower Belly, weighing fifteen Pound, and was of a very compact Subſtance; the right Teſticle was as big as both a Man's Fiſts, containing in the midſt of it a Glairy Matter, reſembling the white of an Egg. The Womb it ſelf was no bigger than that of a Child of eight years Old.

Bartholine and *Foreſtus* aſſure us, that a Woman with Child having the Small-Pox, was after delivered of a Child who had Scars, from whence it is evident that the Mother and the Child had the Diſtemper both at the ſame time.

Amatus Luſitanus, *Centur.* 5. tells us that a Woman with Child having taken an Infuſion of *Saffron*, was after delivered of two Girls, whoſe whole Bodies were tinged Yellow. This Accident gave occaſion to ſome *Virtuoſi*, to make the Experiment in a Bitch, whoſe Whelps become all Yellow.

In the *Miſcellanea Curioſa*, *Obſ.* 42. there is a Relation of a Woman in *Hungary* who being in Labour, and the *Fœtus* having his Head out, drew it back into the Womb, where it continued a Fortnight longer, and

and after was born without any ill Accident.

Mr. *Boyle* in his Experimental Philosophy, relates that a Child was heard to cry in his Mother's Belly.

In the *Scholion* to the 62 *Obs.* of the *Miscell. Curiosa*, we are told that in the Year 1624. a Woman nine Months gone with Child, heard her Child sigh in her Belly whilst she was in the Town-Church at *Colberg*, several Women besides heard it. After this Child was born, its Mother and it self were both poisoned by a certain Person, her Husband died of the Plague, the House in which she lived was fired, and a great part of the Family Burnt, and others lost their Limbs, and not long after a terrible War broke out in that Country, all which Mischiefs the People did believe, this Child's sighing did Presage.

Pliny in the third Book of his *Natural History*, *Chap.* 3. relates that a Child being half born, retired back into his Mother's Womb. This Prodigy hapned the same year that *Hannibal* destroyed the City of *Saguntum*.

Of the Cæsarean *Birth.*

THIS Operation is *an Incision into the Belly and Womb, to take out the* Fœtus.

THE CAUSE of this Operation is the largeness of the *Fœtus*, which cannot pass by the Natural and Ordinary Way, or perhaps its breaking through the Womb, and so falling into the Belly, or the Womb insinuating it self through the Rings of the Abdominal Muscles.

THE SIGNS. The largeness of a Child is easily known, by the Mother's Belly being excessively Swelled. This may be further convinced if putting your Hand up into the Womb, you find there is an *Hydrops*. You may conclude, the Womb has thrust it self through the Rings of the Muscles, if it be not in its proper place; and you may believe the Child has forced its way into the Cavity of the Belly, if there be nothing in the Womb, and you have certain indications of the Woman's being with Child.

The OPERATION.

Place the Woman on her Back, and then make a Longitudinal Incision below the Navel, the Body of the Womb, and put the *Linea Alba*, and cut through the Tegument till you lay the Womb bare; be sure to make the Incision large enough to extract the *Fœtus*, and when this is done make an Incision through the Body, and on one side the Womb put the fore-finger of the left Hand into the Incision to widen it, and guide the Point of the Scissars or Knife on the Finger, to prevent hurting the Child; then open the Membranes which contain the *Fœtus*, and bring both it and the Burthen that way, after having dextrously disingaged it. Wipe the Blood off the Wound with a Spunge dip'd in Wine warmed, and make the Suture of the Belly, as in its proper place was directed, without stitching the Womb at all.

THE DRESSING is the same as in the *Gastroraphia*. Put a Pessary into the *Vagina* for the more easie evacuating the Blood and Cleansings, and making Injections into the Womb.

Fig. I.

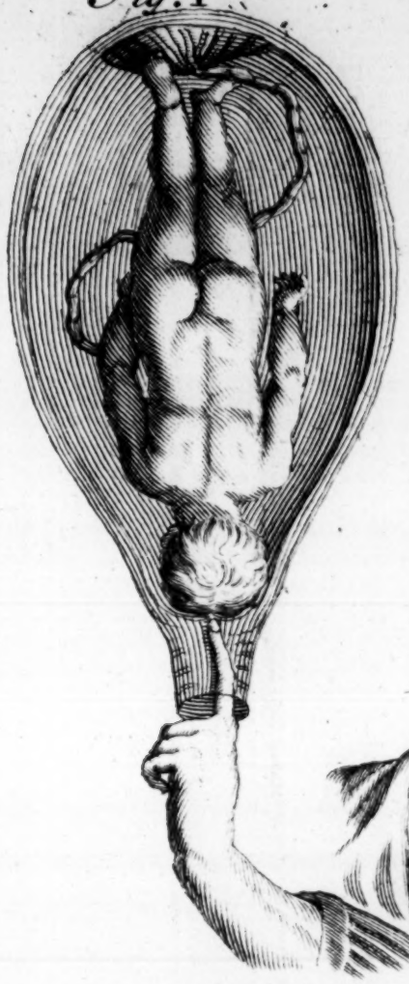


Fig. IV.

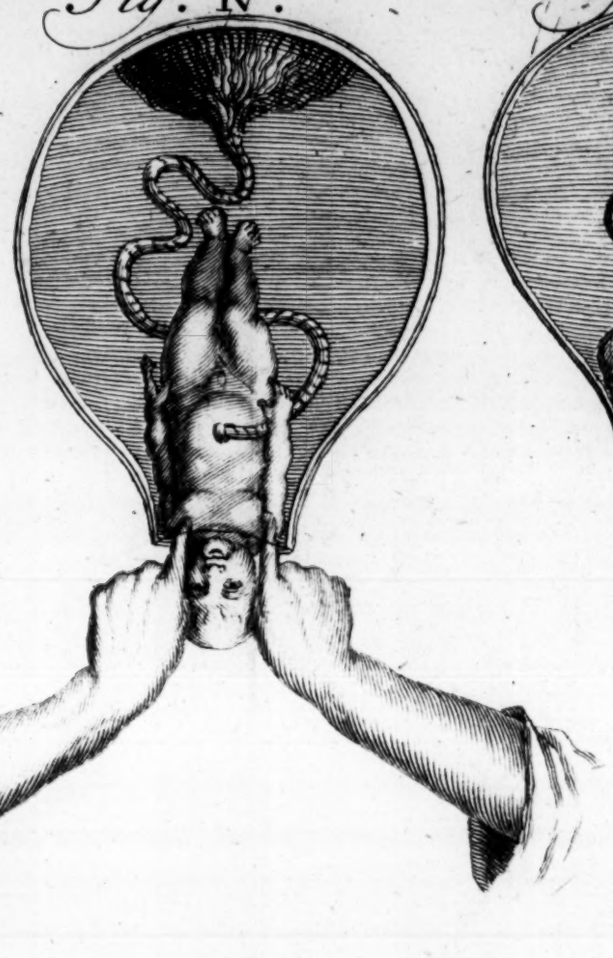


Fig. VI.

Fig. VII.

Fig. XVII.

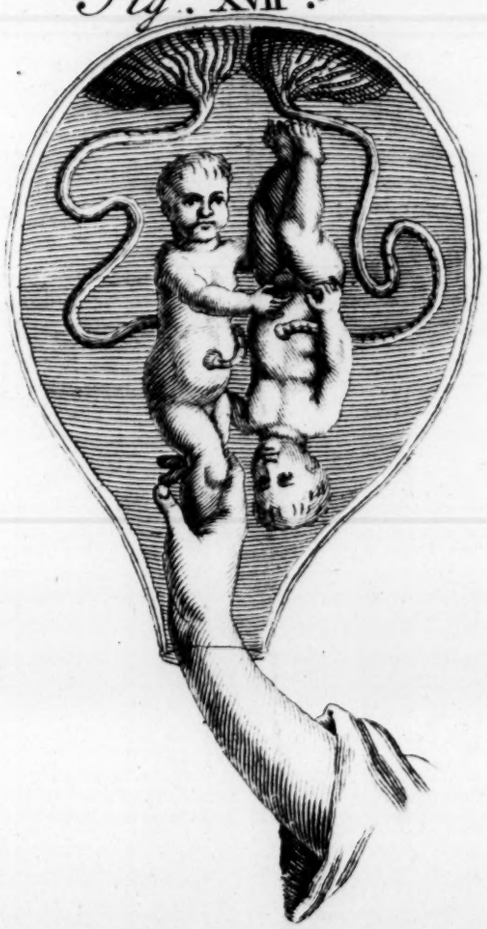


Fig. XIX.

Fig. XXVIII.

Fig. XXIX.

Of the different Deliveries of Women in Labour from M. Viardel, Surgeon to the late Q

Fig. XI.

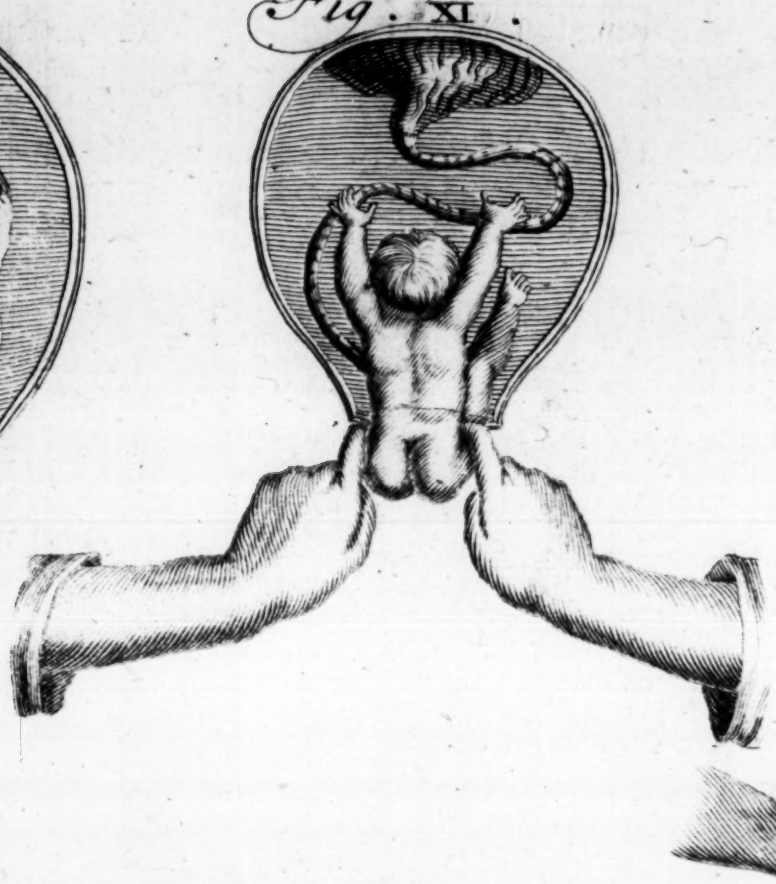


Fig. XII.

Fig. XXXII.

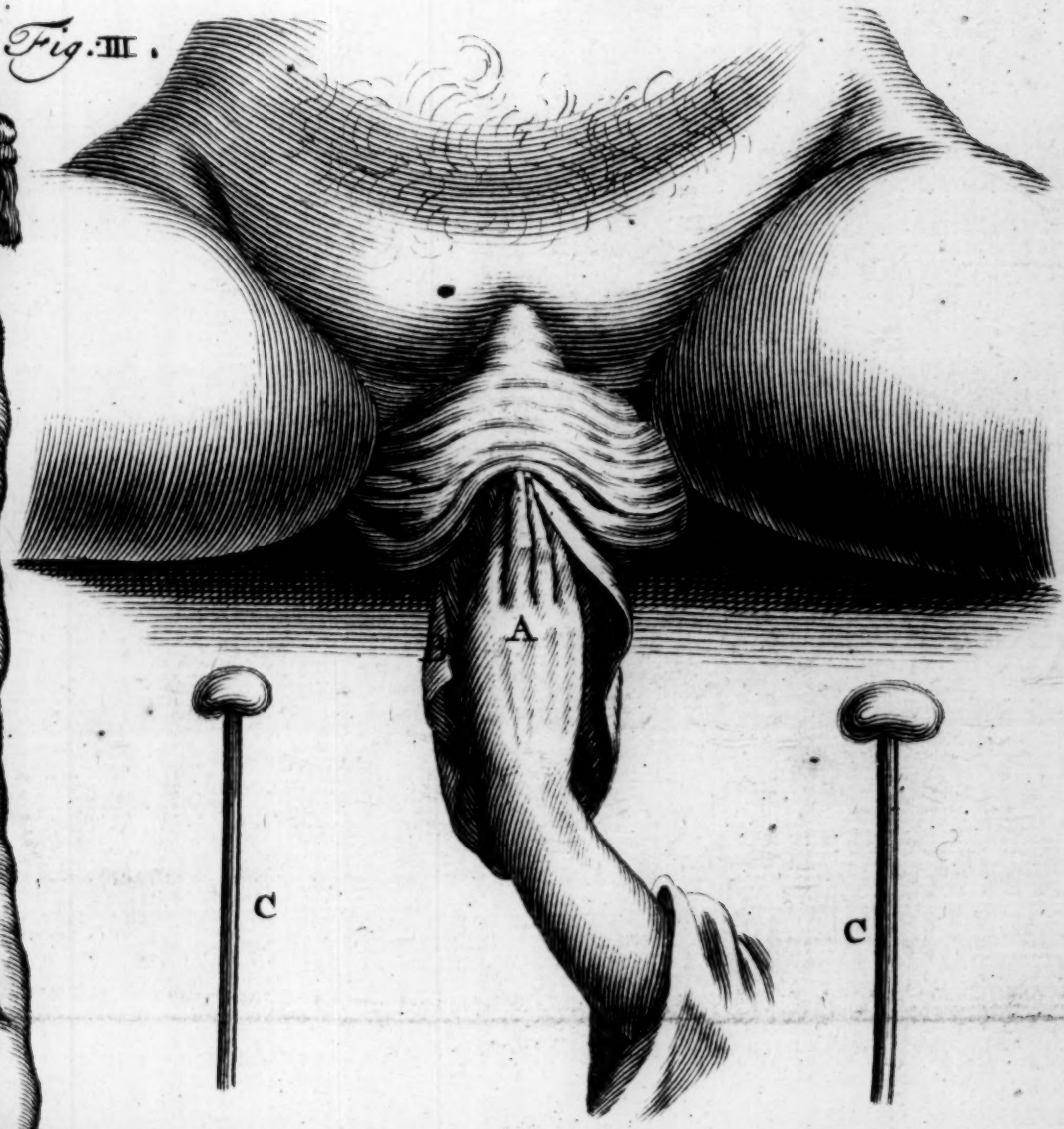
Fig. XXXVII.

Fig. XXXVIII.

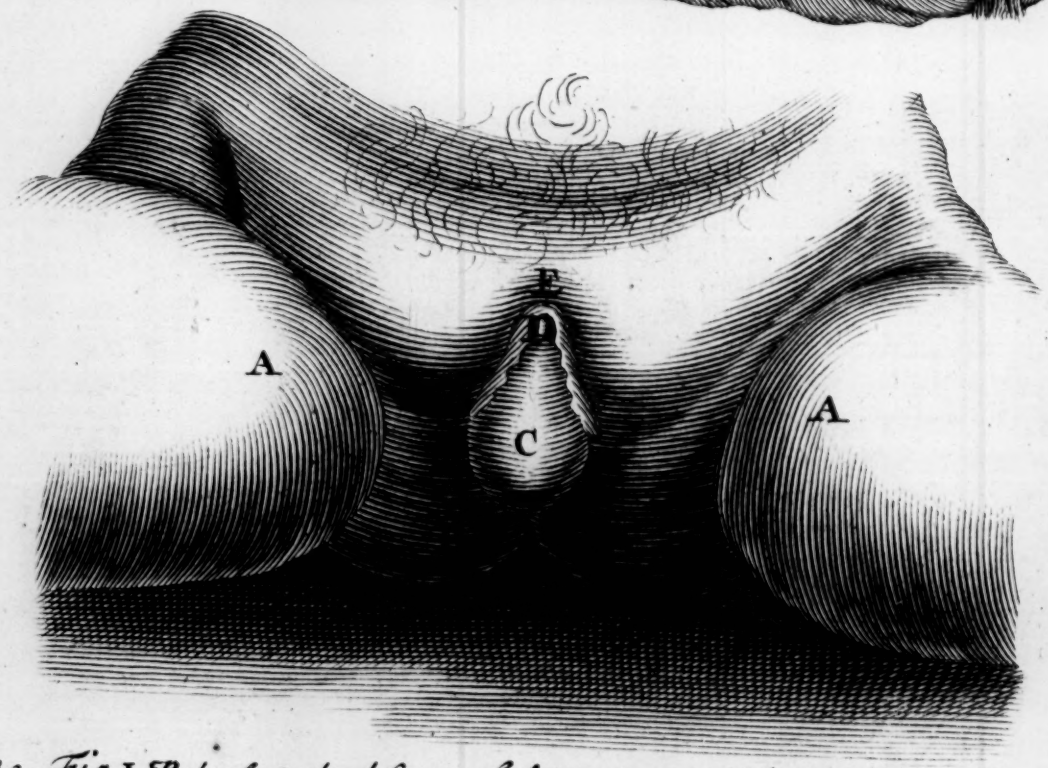
Of the Natural Situation of the Child when ready for the Birth.

Ch: 30: Of the falling down of the Womb & ye manner of reducing it.

Fig. III.

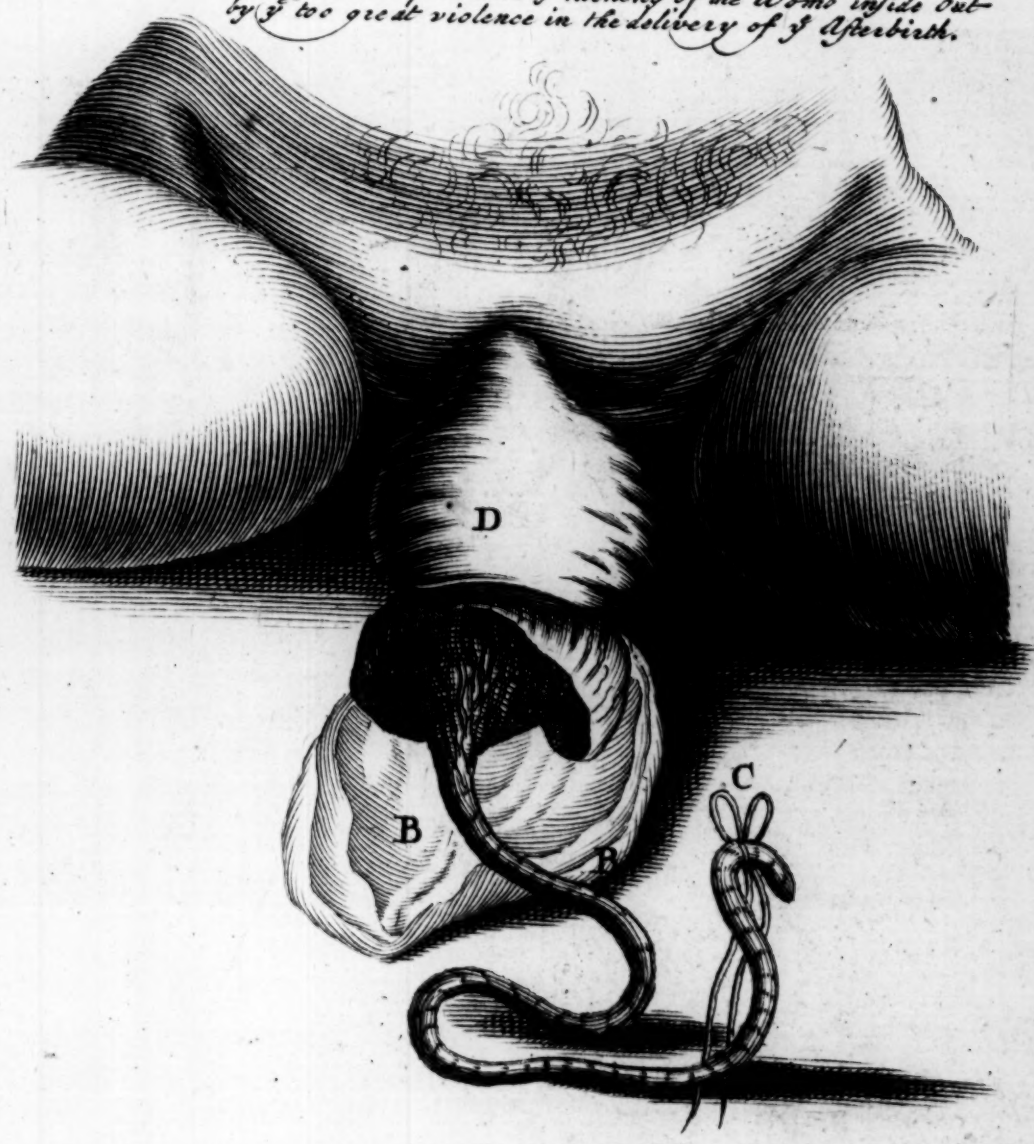


Ch: 30 Fig. II. *Representg ye turning of the Womb*



Ch: 30. Fig. I, Represents the descent of ye Womb call'd ye Precipitation.

Ch: 30 Fig. II, Represents ye turning of the Womb inside out by ye too great violence in the Delivery of ye Afterbirth.



EXPLICATION *of Figures. Taken from* Mr. Viardel, *Chirurgeon to the late* French *Queen.*

THE Manner of feeling for the Child when it lies ready for Birth in a natural Situation.

Fig. IV. Of widening the Paſſages with the Hands, to make room for the Shoulder of the Child when the Hand is born.

Fig. VI. Of the Delivery when the Arm presents firſt.

Fig. VII. To turn the Child when the belly lies to the Birth.

Fig. VIII. A Woman delivered of a Mole, and a Child afterwards.

Fig. XI. A Delivery where the Buttocks present firſt.

Fig. XII. Of a Delivery where the Face comes firſt into the Neck of the Womb.

Fig. XVII. A Delivery of Twins.

Fig. XIX. A Delivery where the Knees preſent firſt.

Fig. XXVIII. The Manner of taking a Child out of the Womb when delivered by the Feet.

Fig. XXIX. The Way of delivering the After-birth when the Child is born; as alſo how to tie the Navel-ſtring.

Fig. XXXII. How to deliver the Head when the Body is ſeparated from it.

Fig. XXXVII. Of a Delivery made when the Neck comes firſt into the Birth.

Fig. XXXVIII. To deliver the Child when the Hips lie in the Paſſage of the Womb.

CHAP. XXX.

Fig. I. *Repreſents the Deſcent of the Womb, called the* Precipitation.

A. The Thighs ſpread.
B. The two Branchings of the Seat.
C. The Body of the Womb, that iſſues out of the external Orifice.
D. The external Orifice.
E. The uppermoſt Part.
F. Several Peſſaries of different Sizes for different Perſons.

II. *Repreſents the turning of the Womb inſide out by too great a Violence in the Delivery of the After-birth.*

A. The After-birth ſticking to the Bottom of the Womb.
B. The two Membranes thereof.
C. The Ligature or Navel-ſtring.
D. The Body of the Womb inverted.

III. *Of the Falling down of the Womb, and the Manner of reducing it.*

A. The Hand that reduces the *Matrix*.
B. A Linen Cloth put upon the Fingers to puſh it up.
C. C. Two Box Sticks, made with round Heads to puſh up the Womb, when the Hand is too large, or the Neck of the Womb too ſtrait.

Of

Of the Diſeaſes and their Cures, that are more peculiar to the Pr
Parts, as well as the parts of Generation in both Sexes; eſp
ally of the Fiſtula in Ano, *with the Caſe of the preſent* Fre
King: Taken from Mr. Monnier's *Treatiſe of the* Fiſtula,
dedicated to Monſieur Fælix, *firſt Chirurgeon to that Ki*
the reſt from Michaelis, Ettmuller, *St.* Hilaire, Dionis,
Together with two Remarkable Caſes of the Bubonocele *f*
Mr. John Proctor, *Surgeon at* Carliſle *in* Cumberland.

Of the Bubonocele. *From Mr.* Dionis *and Mr.* Proctor.

THE *Bubonocele* is a Tumour in the Groin, which has the Figure of a *Bubo*, and comes in the ſame place where they do; its name is derived from *Vouvon*, which ſignifies Groin and *Kele* deſcent, ſo that this Tumour reſembles a *Bubo*, and is really a Rupture. The Surgeon muſt not be deceived in the Judgment which he is to make of theſe Tumours, for if he ſhould miſtake a *Bubonocele* for a *Bubo*, and expecting to find it charg'd with Matter ſhould open it, he would kill the Patient; wherefore he muſt examine the Indiſpoſition, obſerving that a *Bubo* comes by ſlow Degrees, and a *Bubonocele* all at once, and alſo informing himſelf whether the Patient has a Rupture, and whether he has not ſome way ſtrained himſelf. If he attentively remarks the Accidents which accompany theſe Infirmities, he will find that the *Bubonocele* is accompanied with violent Pains, with Vomitings, which do not ceaſe as long as the Tumour continues, and alſo that what the Patient brings up, has the ſmell of Feculent Matter, which does not happen in caſe of a *Bubo*.

The World has given the name of *Miſerere* to theſe ſorts of Infirmities, when in the Paroxyſm or Fit, becauſe the Patien
then real Objects of Pity, and move C
paſſion; they require a very ſpeedy
which we apply our ſelves to Procur
endeavouring to force back into the
the part which is fallen out, and whic
caſions this Tumour. To compaſs w
we muſt try to reduce it, as we do
Hernia's, which if we cannot do, the
ent muſt be placed with his Head d
wards; and puſhing back the Tu
with more addreſs than Violence, we
force it in again. Sometimes this Tu
has been reduced by throwing cold W
on it; but it belongs to the Surgeon t
in practice all means poſſible to attain
end, and if all his Pains prove ineffe
he muſt make uſe of the following
plaſm, made of Marſh-mallows, with
Roots, Melilot, Camomile, Fenugreek F
boiled to a Poultiſe, with Hog's-greaſe, F
Butter, or Oil of Lilies; This Catap
compoſed of emollient Herbs muſt be
very Greaſy, that it may the better M
and Relax; it muſt be ſpread very T
and left 12 Hours on the Part, taking
and ſubſtituting a freſh one, the Su
muſt again try to reduce the part whic

quently ſucceeds after the uſe of theſe *Cataſmus* without being obliged to come to *Operation*. If within the compaſs of two or three days we cannot reduce this Rupture, if the Pain and Vomitings augment rather than diminiſh, the Surgeon is to advertiſe or ware the Patient of the danger which threatens him, and propoſe the Operation to him as the ſole way of ſaving his Life; he muſt alſo taking apart his Relations, ſhew them the danger in which he is, in order to their adviſing him to ſettle his Affairs in the World. When a Surgeon has without Heſitation acquainted the Patient that he muſt of neceſſity reſolve to die, or undergo the Operation, there are none but will chuſe the laſt.

Having fix'd the time, and prepar'd the *Apparatus*, we move the Patient to the edge of the Bed, on the ſide on which the Tumour is, and place a Cuſhion under his Buttocks, the Surgeon kneeling by the Bed, and having placed a Servant at his Right, and another on his Left, he begins the Operation, by taking the upper Skin off the Tumour, which he pinches and cauſes to be held by a Servant in order to cut it, with the *ſtrait Inciſion Knife*; he makes an Inciſion two Inches long, then ſeparating the Lips of the Wound he tears the Membranes which envelope the Tumour, while his two aſſiſtants ſeparate the Lips of the Wound. After having lacerated or diſſected theſe Membranes, we diſcover the Purſe which contains the Inteſtine, we open it gently, and with great Circumſpection; the Surgeon muſt not be ſurpriz'd, if after having a little open'd it, he ſees a ſort of Serous Humour iſſue out, this Purſe almoſt always has it. I have obſerved ſuch a great Quantity, that this Water ſometimes flew up to the Bed's-Teſter; when the Liquor is come out he introduces a hollow Probe, in the Aperture which has made him a Paſſage, and with his Sciſſars, one branch of which is guided in the Chanel of the Probe, he opens the Purſe its whole Length, and then ſees the Inteſtine diſcover'd. He draws out as much again of the Gut as is enter'd in the Bag, that the Matter of which it is full, being contained in a larger Space, may facilitate the Introduction of that Entrail. He then takes the ſame Probe, which he introduces into the Ring of the Muſcles, thro' which the Inteſtine came out, and raiſing it up, ſo that the Entrail be not clogg'd he ſlides the point of his Curve Inciſion Knife, into the Chanel of the Probe, and raiſing the Knife at the ſame time, that he withdraws it, he cuts the edges of the laſt Ring, which is that which occaſioned the Suffocation: In making this Inciſion on it, he will hear a Noiſe, as though he was cutting of Parchment. The Wound being clear'd of the Probe and Inciſion Knife, he feels with his Finger to examine whether the paſſage be Free, and well clear'd of its Bridle, then puſhing in the Inteſtine by little and little, he continues till he has reſtored it into the Cavity of the Belly, obſerving to thruſt that in firſt which came out laſt; then he tells the Patient, he muſt move a little towards the Right and Left, that by this Motion, the Inteſtines may each of them reſume their ordinary Place.

If no more than the Gut be in their Tumour, the Operation is finiſhed when that part is reduced; but if the *Epiploon* or *Caul* come out with it, it cannot accompany it in its return to its Place; for if the Air come but for never ſo ſhort a ſpace of time to the *Epiploon* it Putrifies, and that part of it ſo corrupted muſt be cut off, to which purpoſe the Surgeon takes a Needle threaded, and with it binds that part of the *Epiploon*, which was in the Tumour; and after having faſtned and knotted it, he runs the Needle thro' the *Epiploon*, ſo bound, that the Thread may not ſlip, then with the Sciſſars he cuts off the *Epiploon* below the Ligature, and thruſts back that part which is Bound; that is, the ſound Part into the *Abdomen* with the utmoſt Diligence. The Surgeon muſt obſerve two things in the Ligature of the *Caul*; Firſt that in performing it, he draw forth a ſufficient part of that *Reticulum*, to perform it on a part not yet corrupted by the Air; and ſecondly, that the ligature being made, an end of the Thread, about a foot long, be left to hang out of the Wound, in order to draw out the Knot, when Nature ſhall have ſeparated it.

All the Operations practiſed on the *Bubonocele* are not ſo eaſy as that which I have been deſcribing. That Infirmity is frequently attended with Circumſtances which ren-

der it very difficult. Adheſion is one of the moſt Troubleſome and Painful. There is one Misfortune to be feared in this Operation, which is, that frequently by the Patient's ſtaying too long we find the Inteſtine Gangren'd and Putrefy'd, ſo that it tears like wet Paper; this commonly happens to people of Quality, who long defer their Choice, by reaſon of the great number of Perſons depending on them, who all propoſe their Remedies, which they will try before they ſubmit to Operation, which by this delay become uſeleſs, and that the Surgeon ought to know by the redneſs or lividneſs of the Tumour, by the Diminution of the Patient's Strength, by Augmentation of the Symptoms, and by the long date of the Infirmity. In this deplorable caſe the Surgeon muſt not undertake the Operation, ſince all hopes of cure are paſt.

The Inteſtine and *Epiploon* being return'd into the *Abdomen*, the Patient no longer feels any Pain, eaſe ſucceeds the Complaints, which we heard him before Utter, and in a moment he taſtes the Fruit of the Operation. But before dreſſing him, two particulars are requiſite to be obſerved, in order to render the Operation perfectly Compleat. Firſt to cut all the Membranes which compos'd the Purſe or Bag; and Secondly, that if the Rupture was fallen from the *Groin* into the *Scrotum*, that part muſt be laid open, its whole Length, to prevent a Purſe growing at its Bottom, to receive the Matter in time of Suppuration.

All theſe Circumſtances obſerved the Operation is finiſhed, and the Wound is to be immediately dreſs'd. The Surgeon then begins with his Tent, which for the firſt time, as well as the Pledgets, muſt be cover'd with Yelks of Eggs, mingled with Oil. This Tent then muſt be thus capp'd, faſtened to a String, and be large enough to occupy the Aperture of the Rings, and to oblige us to force it in; he then with two ſmall Pledgets fills up the remaining Parts of the Inciſion, and covers it with flat Pledgets, he lays on a Plaiſter, and over that a Bolſter, which muſt be Thick, the better to contain the Part. He then Embrocates the Belly, and Purſe of the Teſticles, with Oil of Roſes; he applies a ſquare Bolſter to the Belly, and a long one ſerves for a Truſs to the *Scrotum*. Theſe Bolſters muſt be m ſten'd in warm Wine, and a Band, muſt provided to keep them all on; the Ba muſt be *Inguinal*, reſembling the form a Spike, and its Circumvolutions muſt made around the Body and Thigh, Band re-aſcending betwixt the Thigh, a the Purſes of the Teſticles, like the *Herni* Bandage, and alſo form a Croſs on the *Gr* and every time that it paſſes, muſt be faſt with a Pin to render it the firmer.

Though the Operation be well perform and conſequently the Vomitings ſhould e they yet frequently continue ſome Da But the Surgeon ought not to be ſurpri though that happen, becauſe the Periſtalt Motion of the Guts tending to preſs dow wards what is contain'd in them, when Parts are in their Natural State, take a c trary courſe during their Suffocation; w the paſſage being ſtopped, the contained *culencies* are forced upwards by an Anti riſtaltick Motion, which continues ſo days after the Operation, the Guts not h ing yet re-aſſumed their Spring and Natu Contractions. Some Operators make t Patients ſwallow leaden Bullets, but t practice is Dangerous, and 'tis much be to give them ſome Laxative *Ptiſans* to t out this Excrementitious Matter, by the which it ought to paſs. The next day a the Operation, in dreſſing the Patient don't take out the Tent, but if it come of it ſelf put it in again: When 'tis placed in the Rings, we leave it for two three Days, and make uſe of a ſtrong D ſtive, to avoid the Putrefaction of the P to which they are but too Subject; we pour on the Wound ſome drops of *vanti*'s Ballam to enliven it, and take to put in a Tent large enough to occupy whole Paſſages, this we don't diminiſh otherwiſe than in proportion that the Fl returning denies it entrance in ſo large Bulk. To conclude, the Inciſion being c red and cicatrized, we oblige the Patient wear a great Bolſter and Bandage for t ſpace of two or three Months, for fear t by ſome freſh Strain, the Inteſtine ſhould gain ſlip to the place from whence it h been driven, which has ſometimes ha pen'd, for want of Precaution. The adv tage reſulting from this Operation, is t

hen it is well performed, and the Patient ell cured on one Side, and is out of fear f any deſcent on that Side, becauſe the ci-atrizing of all the Parts, retains the Guts nd *Epiploon* in their Places. It may indeed appen on the other Side, and there are in-tances of Perſons who have been obliged to ndergo the Operation on each ſide at diffe-ent times.

After having inſtructed you in the ways f curing theſe Accidents which fall on Men, is proper to ſpeak of thoſe to which Wo-nen are liable, in order to afford them the elp which they don't leſs want than Men n theſe cruel Infirmities. Women are not ndeed afflicted with ſo many Species of *Hernia*'s as Men, they have no other than hoſe we ſtrictly and properly call *Hernia*'s; mean tho e which are produced by the arts, as the *Enterocele*, the *Epiplocele*, and he *Entercepiplocele* being deſtitute of thoſe which happen from a ſettlement of Hu-nours, and are *Hernia*'s only in Appearance, hat Sex not having any *Scrotum*, which is he place where theſe Infirmities Grow; and or the ſame reaſon their *Hernia*'s are almoſt lways Imperfect, the parts being more fre-quently obliged to ſtop in the Groin, be-cauſe they don't find ſuch a Purſe as the *Scrotum* to ſlide into.

Women have at their *Matrix* two Liga-ments which are call'd Round, from their Fi-gure, and Inferior, from their Situation; they proceed from the lateral Parts of the Fund of the *Uterus*, one on each Side, and in their deſcent they paſs through the Rings of the three Muſcles of the *Abdomen*, then di-lating themſelves in the ſhape of a Gooſe's-foot, they inſert themſelves into, and loſe themſelves in the Thighs; the Paſſage which they make is almoſt like that of the Sper-matick Veſſels of Men, and 'tis by the ſame way on occaſion of ſome Strain that the *In-teſtine* and *Epiploon* ſlip out, and produce *Hernia*'s in Women, which give us as much trouble to cure as thoſe of Men. To this day all Anatomiſts have believed that the uſe of theſe Ligaments, was to hinder the Fund of the *Matrix* from ſlipping too high up: But the Bottom and Neck of the *Uterus* being but one Continuity, and the latter being ſo firmly to the Neighbouring Part, 'tis ſcarce poſſible that the former ſhould change its Place. I ſhould think Women very unhappy, if for ſuch an imaginary advantage as that, they ſhould be forced to ſuffer real Inconveniencies, ſuch as are the Pains occaſion'd by theſe Ligaments during their Pregnancy, and the *Hernia*'s to which they are liable; and from which they would be Exempt, if there were no Paſſage for them. I own they receive another advantage by them; for I affirm that they advance the Fund of the *Matrix* forwards, towards the external Orifice; their ſtructure and the neceſſity of the *Matrix* advancing to meet the Seed in order to receive it, prove my Aſſertion.

The *Hernia*'s which Women labour under, commonly remain in the Groin, ſometimes they deſcend to one of the Lips of the external Orifice, being always cauſed by Strains, as are thoſe of Men; they are alſo cured by the ſame Remedies and Bandage, except only that the *Steel Bandage* or Truſs is not proper for them, and that we make uſe of the *Inguinal* or *Muſhroom Bandage*. When 'tis attended with a Suffocation, we have recourſe to the Operation practiſed on the *Bubonocele*, which in the Sex is not accompanied with ſuch grievous Accidents as in Men; but Women are alſo more ſubject to them, becauſe the way through which the round Ligaments paſs, is ſtraiter than the Paſſage which gives iſſue to the Spermatick Veſſels of Men.

An extraordinary Caſe of a Bubonocele, *together wi another rare Caſe of an Umbilical Abſceſs; Commun cated by Mr.* Procter, *Surgeon at* Carliſle *in* Cum berland.

ROBERT DOBINSON of *Aglion-by* in the County of *Cumberland*, Aged 65 Years, having labour'd under a *Bubonocele* for the ſpace of 20 Years, which by reaſon of its largeneſs and extraordinary Weight he was obliged to ſupport with a Band or Truſs, contrived by an ingenious Perſon nigh *Kendal* in *Weſtmorland*; on the latter end of *July* 1709, being engaged to go ſome Miles from home to fetch Coals, and having neglected to put on the ſaid Truſs, by violent ſtraining the *Hernia* fell down that Night very Large and Ponderous, and altho' he continued his former Method of Reduction, which had always prov'd Succeſsful, yet at this time it was of no Effect; for ſoon after his fruitleſs endeavours to reduce the ſame, and other Methods uſed by ingenious Neighbours to no purpoſe, he was ſeized with a violent Inflammation, Tenſion and Swelling of the adjacent Parts, attended with a burning Fever, *&c.* which cauſed him to cry out Night and Day, and at length form'd an Abſceſs upon the left Groin, extending it ſelf over the *Abdomen*, being attended with Heat, Inflammation, Tenſion, *&c.* which by no means could be eaſed, but continued for 3 Weeks or longer: At laſt it Apoſthemated, and there appear'd ſeven large and wide Orifices, out of which daily iſſued a Fætid, and purulent *Sanies*, and the *Excreta* ſeemed to flow out at one of the largeſt Orifices, his Body remaining bound for the ſpace of 14 Days, as I was Inform'd. They expecting every day his Departure, and giving over all hopes of his Recovery; at laſt by the advice of *J. B.* a Neighbour, he was prevail'd upon to ſend for me, after much Entreaty, not believing the Caſe ſo dangerous as it afterward appear'd. However, when I came to exami the Patient, finding ſeven large Orifi and upon ſearch the Probe tinctur'd wi the *Excreta*, his ſtrength Waſted, and Body extreamly Emaciated; obſerving th diſmal Circumſtances, I gave my Opinio that the Guts were penetrated, and how d ficult it would be to heal ſuch penetrati Fiſtulous Ulcers, becauſe we cannot app Topicks to induce Conſolidation. The *ſcera* being Thin and Membranous, a having but little Blood which is the *Me um* of Unition, and ſuch like Ulcers bei apt to creep between the Tranſverſe and o lique Muſcles, which are very numerous thoſe Parts.

Theſe things being laid before his fo mentioned friendly Neighbour, who out pure Charity ſent for me, and not bei willing to leave the poor Man in ſo d plorable a Condition, he entreated me to all that was in my Power to aſſiſt him, a he would himſelf dreſs him every Da which accordingly he did: And obſerv in the firſt place, that his Body was Boun therefore he order'd him to eat ſome emol ent Herbs, and likewiſe Groat Pottage, Water Gruel, and coming to dreſs him, took notice that the Groats or Husks there lodg'd about the Ulcers, with the ſtalks of t forementioned Herbs, and that other Ed bles were diſcharged that way; particula ly that which confirm'd his Opinion mo was, that ſome Neighbours coming to vi this poor Patient, gave him a few Cherr to refreſh and cool his parch'd Stomach and that the Cherry-ſtones after a little ti were diſcharged at the ſaid Orifices. M

Frie

friend no longer retaining his Incredulity, hat the *Viſcera* were penetrated, immediate- ſent for me again, the Patient's Wife and ther People about him informing me that here was a piece of Pudding Skin, to uſe heir own Expreſſion, about half a finger's ength, lying at the Mouth of the largeſt Orifice, which they endeavouring to cleanſe f the *Sordes*, they pull'd out the ſaid piece f Membranous Gut, and then concluded all ndeavours were in Vain. But we being willing to uſe the utmoſt means poſſible reſolved to proceed, eſpecially ſince we had met with ſome Encouragement, by what I had order'd him, which with the bleſſing of Almighty God had freed him from his Fever, parching Heat, Thirſt, Inflammation, Tenſion, *&c.*

Yet after all this, I was at a loſs to make him evacuate as Nature Required, for altho' I order'd ſuch powerful expulſive Carminative Clyſters to be injected daily, and eſpecially ſuch as are chiefly us'd in our Hoſpitals, and aboard Her Majeſty's Fleet, wherein I had the Honour to Serve, yet they were generally diſcharged at the Orifices, and little or none at all by the *Anus*. I then thought of performing the *Gaſtrorhaphy*, but conſidering the diſcharge of ſo large a piece of Gut, which ſince the caſe happen'd I am inform'd was larger than deſcribed, the Patient being given up for a dead Perſon; but reflecting again on his great Weakneſs, and other Melancholy Symptoms, with the advice of his friendly Neighbour I omitted it, concluding th t if he died, which was moſt likely, the World wou'd have ſaid the Operation had haſten'd it. Therefore I dreſs'd with our Balſam Zenodoct, mixed with Traumaticks, and endeavoured to heal the Ulcer with all Expedition, but alaſs, to no purpoſe, for in ſpite of all we could do, he conſtantly diſcharged the *Excreta* by the Ulcers, and none at all by the *Anus*. Here was no room left with the famous *M. Belloſte*, for ſeldom Dreſſing, for that which encreaſed my Trouble, and the Patient's more, wa-, that although the former Clyſter did ſeem to exonerate the *Viſcera* very well, yet I could not cauſe any to return the ſame way it was Injected, but Malgre all endeavours for the ſpace of a Month, or longer, it conſtantly flowed thro' the Ulcers; and what added more to my Trouble was, that although I kept the Patient to a moderate opening Diet, and that ſparingly; yet as ſoon as the *Viſcera* were fill'd with the *Excreta* the Patient was in extraordinary Pain, which could by no means be allayed or eaſed, though I exhibited Anodynes and Opiate Mixtures, ſtill he diſcharged himſelf by the foreſaid Ulcers; as I had often obſerved when I came to dreſs him; he deſiring me to give him leave to diſcharge the *Excreta* that way, or elſe, as he expreſs'd it, would fill all the Dreſſings and torment him: Things being in this Condition, and my fears encreaſing by reaſon the external Ulcers began to Incarn, and yet notwithſtanding he diſcharged as much *Excreta* at the Ulcers as formerly; being therefore willing to leave nothing undone, I order'd Cordial Juleps, Anodynes, Analepticks, *&c.* and to the former Clyſter added Balſamicks diluted with Traumatick Dococtions: Therefore I gave twice a day my Analeptick Tincture, the uſe whereof I approved in *Spain*, in internal Wounds, Ulcers, *&c.* at the Siege of *Barcelona:* I alſo order'd ſome of it to be injected with the Clyſter, which by the bleſſing of God reſtored the *Viſcera* to their wonted Tone of diſcharging the *Excreta* as Nature Required, and about ten days after I found the *Viſcera* reſtored, and ſuch good effects follow that I healed the external Ulcers; ſo that in a little time the Patient went abroad into the Fields to bind after the Shearers Reap'd Harveſt, Thraſhed and performed all the parts of Husbandry, and is ſtill a living Monument of God's Mercy, whereof there are ſeveral Witneſſes to atteſt it, and that without the leaſt appearance of a *Rupture*, although the cure was perform'd near four years ago.

June 23, 1712. *J. PROCTER.*

An

Another extraordinary Caſe by the ſame Author, J. P.

A Perſon aged nigh 50 Years, in the County aforeſaid, who had laboured under a *Boil* or *Brooke*, as they term it, that form'd a large Abſceſs upon the middle part of the Umbilical Region, about an Inch below the Navel, as I remember: The Relations of the Patient endeavour'd for 3 Months together to break this *Boil*, but all in Vain; at length they forc'd it with hot *Cataplaſms*, and got ſome Neighbour to open the ſame expecting a great diſcharge from it, and thinking to heal it up again, but could not; upon which they apply'd to an ingenious Lady, their Neighbour, for help; and their fears increaſing by a Conſumption of Strength, and all the parts of the Body and Ulcer inſtead of Healing, diſcharg'd every day more and more. At length they ſent for me; when I view'd the Parts, and obſerved the Patient's Linen, it was Wet, from the Region of the Navel, and upwards, quite to the Skirt, and likewiſe his Breaſt all over Wet, the Orifice being only as large as to receive a Wallnut. I demanded when they dreſs'd him, he being in Bed; they told me that he was ſhifted ſince the Meſſenger came for me, and all the Wet I ſaw was in the time of riding 3 Miles. I could hardly apprehend how ſo ſmall an Ulcer ſhould diſcharge ſo great a quantity of *Ichor*, but viewing it a little more narrowly I obſerved a vaſt quantity of a chylous like ſubſtance iſſued out with a ſort of bubling Noiſe; and the greateſt part of [his] Breakfaſt, with the Food he had moſt lately Eat, came that way. I then examined the Part with my Probe, and found it diſcharged an Alimentary chylous Maſs, in ſuch quantities that it followed my Probe extreamly faſt, ſo that I could plainly diſcover 'twas Penetrating: However, the Friend not doubting but I could cure him ſince I had cured their Neighbour *Dobinſon* aforementioned, would engage me to undertake him. I aſſured them of the difficulty as well as danger, and difference in this Caſe, between Ulcers of this Part, and others of Parts that were leſs Noble, and of much leſs importance to the immediate ſubſiſtence of Life, and the Nutrition of the whole Body; and I likewiſe informed them of his great Weakneſs he then not being able to turn himſelf in Bed without help. Therefore without more ado, I gave him my Analeptick Tincture thrice a day mixed with Balſamicks, and treated the other part of the Cure, as I had done the forementioned Caſe, ſo that in about 14 days ſpace the diſcharge of the Ulcer leſſen'd and abated, and ſpeedily after he was reſtored to his former Health, only that this laſt Winter he had a violent fit of the Cholick, which made an *Inflammation* in the Part, but with a ſlight Compreſs of Linen and ſome proper Anticholicks he ſoon Recovered.

Of Reducing the Fundament *and* Womb, *and opening parts Imperforate, as the* Vulva, Penis *or* Fundament, *&c. From* M. Vaugion.

THE firſt of theſe Operations is the Reduction of the Gut, into its Natural Place, when it is fallen out. The falling out of the Rectum proceeds from ſtraining in going to Stool, from a *Paralyſis* of the Muſcular Fibres of the *Sphincter*, or a Re-

a Relaxation of them by a conſtant Refluxion of Humidities, or ſome vehement Cough, long Looſneſs, Dyſentery or the Piles, any of which are ſufficient to produce this Effect. This Diſeaſe is viſible enough, part of the Gut hanging out of the *Anus*. If it be of long ſtanding, the Reduction is very difficult and dangerous, and there being moſt commonly a large Tumour, the Gut is Inflamed and Gangrenous. If it proceeds from a *Paralyſis* of the *Sphincter*, the Diſeaſe is very hard to Cure, and whatever pains you take to replace it, it notwithſtanding ſoon falls out again; but when it is recent, or in young Perſons of a good habit of Body, it may be remedied without any great Difficulty.

To reduce the *Fundament*, place the Patient on his Belly, with his head Low, and his hips Raiſed, and having dip'd your Fingers in Oil of *Roſes*, gently thruſt in the Roll formed by the Extravaſation of the Rugous Membrane of the Rectum, or take a Compreſs dip'd in warm Milk, and with this thruſt the Fundament up. Foment the part well, and apply Aſtringents to it, keeping them on with the double Truſs, or the Roller with four Tails, ſuſpended with a Coller; the way of making which Bandage is deſcribed at large, in the Operation of cutting for the Stone, and the *Fiſtula in Ano*.

Let the Patient lie on his Belly for ſeveral days together, that ſo the Gut may have time to recover it's Strength, and rub the part well with Oil of *Beetles*. This Oil is made by the infuſion of *Beetles*, in Oil of *Turpentine* expos'd to the Sun for a conſiderable time: Oil of *Turpentine* will do. If the Belly be Bound give Clyſters frequently, or let the Patient take an Ounce of Oil of ſweet *Almonds*, with a Dram of Cream of *Tartar*. If the Pain be very troubleſome foment the part with a Decoction of Cowſlip and Camomile Flowers in Milk. Fumigations of *Frankincenſe* and *Maſtick* are good, in ſhort, to prevent the Fundament from falling out again uſe all ſorts of Aſtringent Remedies.

To reduce the Womb when fallen out, is to reſtore the Neck of it, to its Natural Place: The Relaxation of the Neck of the Womb after the Delivery, ſometimes proceeds from the Unskilfulneſs of the Midwife in drawing too violently its *Ruge*, and tearing it from the parts to which it adheres, and ſometimes it riſes from the Natural Laxity of the Part. The abundance of Humours which flow hither ſometimes cauſes this falling out of the Womb, as it is commonly but improperly called, ſince it never is the Body of the Womb, which comes forth, but the *Vagina* only. The falling out or Relaxation of the *Vagina* may be perceived without any great Difficulty; there appears a Thick, Hard, round Subſtance, not unlike a Gut, which hangs between a Woman's Legs, and has a Roll at bottom, with a hole in the midſt, which is commonly miſtaken for the inner Orifice of the Womb. A ſimple Relaxation of the Neck of the Womb is not dangerous, if there be no Inflammation, Ulcer, or Gangrene. When the Diſeaſe is Recent, there is no great difficulty in curing it, but if it be of long ſtanding it is incurable. If it proceed from an internal Cauſe, and the Relaxation encreaſe by degrees, the Diſtemper is curable, but if the falling out of the Womb proceed from ſome external Cauſe, as the ſtraining of a Woman in Labour, or the Midwife's forcibly drawing out the *Ruge*, there is but little probability of Succeſs.

For the reſtoring the *Vagina* to its proper Place, let the Patient lie on her Back, with her Hips raiſed, and the Artiſt having firſt moiſten'd his Fingers with Oil of *Roſes*, may then gently thruſt it into its Natural Place. If the *Vagina* be very much Tumefied, and cannot re-enter he muſt by no means handle it Roughly, for fear of an Inflammation or Gangrene, but he muſt humect and foment it with emollient Decoctions, and forbear reducing it till the ſwelling be diſperſed. If there be a Mortification already on the *Vagina*, it muſt be ſpeedily cut off, which is the only means he can have recourſe to, to ſave the Patient's Life. For the doing this, let him make a Ligature on the ſound Part, and cut off that which is Corrupted; and if there be a *Cancer* draw the *Vagina* to him, and extirpate that by the Roots, ſtopping the Blood with good *Stypticks*.

The Dreſſing conſiſts in introducing a Peſſary into the Neck of the Womb, which is to be done in this Manner: Take a good thick Bit of Cork, and cut it into the Shape

of

of a Cylinder of two Inches or more in Diameter, in Proportion to the Largeneſs of the *Vagina.* This muſt not be round, but of any multangular Figure, with a Hole in it, to give Paſſage to the *Menſes.* If any fleſhy Excreſcences grow in the Neck of the Womb, cut them off. If there be any *Venereal Ulcers*, dry them up with Lime Water, mix'd with Spirit of Wine camphorated, four Ounces; *Olibanum* in Powder, one Ounce; burnt Allum, a Dram; Sugar of Lead, half a Dram; diſſolve all theſe together, and apply them hot.

The following Hiſtory made a mighty Noiſe ſome time ſince both at *Paris* and *Tholouſe:* A certain young Woman at *Tholouſe* had a Relaxation of the *Vagina* reſembling a Man's Yard; and ſome pretend ſhe abuſed it that way, it being ſix Inches in Length, and four in Circumference in the Middle, where it was very hard. This Falling out of the *Vagina* gradually increaſed from her Childhood. She was ſearched by the Phyſicians of *Tholouſe*, who gave their Opinion, that this Falling out of the Womb was a real Yard; and upon this Determination, the Magiſtrates of the Town order'd her to go in Man's Habit. In this Equipage ſhe came to *Paris*, where ſhe got Money by ſhewing her ſelf; till, upon Aſſurance that ſhe was a Woman, and a Promiſe of being cured, ſhe was brought into the *Hôtel Dieu*, where the Deſcent was ſoon put up, and ſhe was forced to reſume her Female Dreſs, to her great Regret.

Of opening Parts imperforate.

The Way is to make an Orifice with an Inſtrument in Parts where the natural ones are deficient. The Occaſion is a Deficiency in Nature, when Children are born with their Ears, Noſe, Mouth, Privities, Yard, or Fundament, cloſed with a Membrane, which is a Continuation of the Skin, or ſome fungous or ſcirrhous Excreſcence. Theſe Defects are viſible upon Inſpection, and the Child which is ſo imperforate cannot breath through its Mouth or Noſe, or void its Excrements by its Fundament. If the Auditory Paſſage be ſtop'd by a thick Membrane, the Child will remain deaf all its Life-time, unleſs this Impediment be early removed. If the *Rectum* in Girls open into the Priv ties, this is incurable, and the Excremen will be voided that Way.

The *Fœtus* naturally has a Membrane whi covers the Drum of the Ear; and if t Membrane be very thick, and Nature of own accord does not reſolve it, you mu pierce it with a Lancet, otherwiſe the Pa will be deprived of Hearing. When t Child's Noſtrils are cloſed by a Membra it muſt be cut in the Midſt lengthwa Sometimes Children's Noſtrils adhere to ther after the *Small-Pox*, in which Caſe th may be ſeparated with a *Spatula*; but they adhere too firmly, or are ſtop'd by ſo Carnoſity, the Lancet muſt be uſed.

Sometimes the *Urethra* is cloſed by a Me brane, which hinders the Child from maki Water. In this Caſe, an Inciſion muſt made with a ſtrong Lancet directly dow for fear of wounding the *Glans.* If t *Glans* happen to be cloſed at its Extremi and perforated under the *Penis* in the *Ureth* open its Extremity with a Lancet, and troduce a leaden Pipe to paſs through, a ſcarify the præternatural Aperture, and cic trize it; then bind up the Yard with a n row Fillet, leaving the Child to piſs throu the Pipe. If the *Urethra* was ſtop'd throu its whole Length, you might pierce it w a Bodkin, and then put a leaden Pipe till the Duct were cloſed; for without t the Sides would grow together, and the P ſage be ſtop'd as before.

If the *Anus* be cloſed by a Membrane, y may make an Inciſion lengthways wit Lancet; but if it be ſtop'd by a carnous creſcence, you muſt pierce the Fleſh till *Meconium* appear; but this is dangero and very often the Child dies in the Ope tion. If only the Entry of the *Vagina* cloſed by a Membrane, you may divid with a Lancet; but if the Sides of the *gina* adhere together, you muſt place the tient on her Back, with her Knees rai and her Thighs ſpread, and ſo make Inciſion with a crooked Knife, beginn above, and ending below, with the Back the Inſtrument turned towards the *N phæ*; and in this Manner you may proc to act, till the *Vagina* be open'd.

The Dreſſing conſiſts in introducing T armed with good Digeſtives into the Wou

of there be any fungous or carnous Excreſcencies, which may require a Suppuration to conſume them. If there be no neceſſity of procuring a Digeſtion, introduce *Cannula's* or Pipes of Lead, proportioned to the largeneſs of the Inciſion, to hinder the Parts from adhering together; and for the making theſe Pipes more eaſy, let 'em be well ſmeared with Oil of *Roſes*. When there is a neceſſity of making a large Wound, as there is in caſes of Excreſcences and *Fungus*, let the Patient be prepared by Bleeding, Clyſters, and other proper Medicines before the Operation, and after it is performed let him be confined to a regular Diet.

Van Horn tells us, he had ſeen a Child whoſe *Yard* was perforated near the *Scrotum* and the *Urethra* quite cloſed up, who had an artificial *Urethra* made in this manner. The Surgeon firſt made an Inciſion the whole length of the *Yard*, then he puts in a leaden Pipe, and ſtitch'd the Fleſh on it, and after the Wound was cicatrized there remain'd Callous Chanels, thro' which the Child's Urine paſſed.

Some years ſince in the *Hotel Dieu* at *Paris* there was a Child who had no *Urethra*, and its two *Teſticles* were contained each in a ſeparate *Scrotum*. The Yard had a ſlit between the two *Teſtes* which reſembled the Privities of a Woman, which made moſt, though untruly, miſtake this Child for an Hermaphrodite; for the Probe when it was put into the Slit, paſt into the Bladder, and it appear'd upon Diſſection, that he had not any of the Female Organs of Generation.

Of CASTRATION.

THIS Operation is an *Amputation of the Teſticle.*

THE CAUSE. Divers cauſes may happen where all other Methods will be ineffectual: As for inſtance, when the Teſticle adheres firmly to the Gut, and cannot be ſeparated without loſs of Subſtance: When in great Contuſions the *Veſſels* and *Veſiculæ* are cruſhed, and the influx of the Blood is intercepted: When there is a Varicoſe Swelling which cannot be diſcuſſed by the uſual Applications, or laſtly when the Part is infeſted with ſome Excreſcences of long ſtanding.

The Excreſcences are ſometimes in the ſubſtance of the Teſticle, and ſometimes on its Membranes only; and ſeem to be form'd out of the more Oily and Viſcid Part of the Blood, imported by the Spermatick Arteries, which eſcaping through the Poroſities of the Veſſels, is harden'd and condenſed by the heat of the Part: This extravaſated Matter being lodg'd in the ſmall Tubes, grows Acrimonious, corrodes, huffs up, and diſtends them, and ſo produces Fungous and Cancrous Swellings.

When the external Membranes are affected, they communicate the Cancroſity to the Productions of the *Peritonæum*, and ſometimes it extends to the Parts contain'd within the Cavity of the Belly: But in this caſe the Operation is uſeleſs, ſince not being confined to the *Tunica Vaginalis*, you muſt deſtroy the Veſſels, Rings, and other Parts contained in the *Hypogaſtrium*, to extirpate it.

Whatever is apt to cauſe Obſtructions, may create an Inflammation in this Part: Thus Seed infected with the Pocky Malignity, ſometimes ferments and tumefies the Teſticles.

If a compleat *Hernia*, made by the Deſcent of the Gut, happen when there is any Ulcer or Carnoſity in the Teſticle, the Sanious Matter iſſuing from them, excoriates the Gut, and glews it ſo firmly to the Teſticle, that it is impoſſible to ſeparate them without taking off the latter. Contuſions proceed from ſome external Cauſe, ſuch as Blows, Falls or Cruſhes, which Accidents breaks the Veſſels, and the Blood and Humours ſtagnating in the Parts create Tumours, Abſceſſes and Ulcers.

THE SIGNS of an Adhæſion of the Teſticle to the Gut, is manifeſt to the Naked Eye, when part of its Subſtance is deſtroyed, and taken off to free the Gut, and make the Operation in a perfect *Hernia*. The Sign which without opening the *Scrotum*, demonſtrates the adhæſion of the Teſticle to

the Gut, is that the Gut has remained for ſome time in the *Scrotum* without re-entring the Belly, which yet is not very certain. You may conclude the Teſticle is Bruiſed, if the Patient feel a violent Pain, and after ſome blow or cruſh it Swells. Excreſcences are diſcerned by their Bigneſs, Weight and Hardneſs.

Swellings of the Teſticles are to be feared, becauſe Abſceſſes and Schirroſities frequently follow, if reſolvents have been omitted in the beginning. Inflammations of the Teſticles are dangerous, becauſe they uſually terminate in Abſceſſes, and ſometimes Gangrene.

There remain frequently Schirrous Swellings after Contuſions, which incommode the Patient all his Life, and ſometimes the Teſticle Mortifies. If the Swelling be Hard, Schirrous, Painful, and Inflamed, or be of long ſtanding, and both Teſticles are affected, the Operation will be dangerous.

The OPERATION.

Place the Patient on his Back, with his Buttocks raiſed higher than his Head, and his Legs ſtradling, which muſt be held by two Servants.

Pinch up the Skin of the *Scrotum*, and let a Servant hold it at one end, and your ſelf at the other, make an Inciſion lengthways, (or without pinching the Skin, let the Inciſion be made on the Body of the Teſticle) then free the Carnoſity from the *Dartos*, which inveſts the Teſticle without hurting the Cover of the Spermatick Veſſels, and make a Ligature betwixt the Rings and the Swelling. Cut about a finger's breadth below the Ligature, and take off the Teſticle with the *Sarcoma*, leaving the end of the Thread hanging out of the Wound, without drawing down or compreſſing the Spermatick Veſſels, leſt you throw the Patient into a Convulſion.

If the Cancroſity ſpread it ſelf on the Productions of the *Peritonæum*, conſume the ſuperfluous Fleſh by Cauſticks, or waſt it with ſtrong Suppuratives before you proceed to the Operation. When the proud Fleſh is removed, and the Eſcar ſeparated, make a Ligature on the Spermatick Veſſels near the Rings of the Muſcles, and ſo take off the Teſticle. If the Ligature be made before the ſeparation of the Eſcar, the Patient will be Convulſed. If the Carnous Excreſcence be moveable, and does not adhere to the Teſticle, free it and chooſe rather to leave ſome little part of this Excreſcence remaining on the body of the Teſticle than endanger hurting it. If any Veſſels appear, make the Ligature before you cut the Excreſcence off.

THE DRESSING. Fill the Wound with Doſils armed with a good Digeſtive, Embrocate with Anodynes, apply Compreſſes dip'd in Defenſative Liquors, as *Oxycrat* or *red Wine* very Hot, and laſtly keep the Applications on with the Bag-Truſs deſcribed in the *Hydrocele*.

THE CURE. Digeſt the Wound for ſome time with *Turpentine, and the Yelks of Eggs*, to procure a good *Cicatrix*, and conſume the remains of the ſuperfluous Fleſh. If you perceive any Inflammation, have recourſe to Bleeding, and Clyſters. Be ſure to keep the Wound Clean, and when you obtain a laudable *Pus* begin to Cicatrize the Patient muſt abſtain from all things Salt, Acid, or Sharp.

REMARKS.

Riverius relates an Obſervation of a Man who upon a fall from a Horſe cruſh'd his Teſticles, which tumefied to that degree the *Scrotum* was as big as a Mans Head. The Swelling ſuppurated Plentifully, and there came forth Stones as hard as Flints. The Patient had a Fever and Thirſt, which encreaſs'd continually, Puſtules broke out over all his Body, and his Strength decayed by degrees till he died.

Kerkringius aſſures us, he had ſeen a young Man who had no Teſticles in the *Scrotum*, his Voice was very Muſical, and charmed even the moſt inſenſible of the Pleaſures of Muſick. He happened to have a Fever about 18 Years of Age, felt a violent Pain in the *Scrotum*, and found two great Teſticles fall into them, upon which he loſt his fine Voice, which became like that of other Men.

Of the PHYMOSIS.

THIS Operation is an *Inciſion of the Prepuce, to give way for denuding the* Glans.

THE CAUSE which makes this Inciſion neceſſary, is a contraction of the Prepuce, which ſtrongly compreſſes the *Glans* of the Yard, which except it be diſingaged, becomes Inflamed and Mortifies.

This Impriſonment of the *Glans* is ſometimes Natural, and proceeds from its being wrap'd in the Prepuce, and not from it by any Venereal Exerciſe or Handling. When this Diſeaſe is Natural, the Prepuce forms ſeveral Wrinkles, between which a Tenacious Slimy Matter is lodged, which ariſes from the *Glans*, and glews the Prepuce very ſtrictly to it, ſcarce leaving a Paſſage for the Urine. Sometimes this Diſeaſe is Accidental, and proceeds from ſome Inflammation, Cancer, Wart, Schirroſity, or Unskilful uſe of Corroſive Medicines; but whatever the Cauſe be, the free Circulation of the Blood is interrupted, the Part exceedingly inflamed, and the Fibres of the Prepuce very ſtiff and ſtubborn.

The vehement Pain proceeds from the thinneſs and exquiſite ſenſe of the Membrane of the *Glans*, which is compoſed of, and interwoven with a multitude of Nerves; which Structure renders it very ſenſible, when it is moleſted by any Pungent or Corroſive Matter.

THE SIGNS. This Diſeaſe is evident, the Patient finds great Difficulty in making Urine, has violent Pains, cannot uncover the *Glans*, and moſt commonly a Matter like Plaſter is lodged between it and the Prepuce.

The OPERATION.

This muſt not be undertaken, till all other Remedies have been tryed, ſuch as Bleeding, warm Baths, Digeſtives mixed lightly with ſome preparation of *Mercury* (and introduced between the Prepuce and the *Glans* with the end of the Probe) *Galen*'s Cerate, emollient Injections, a ſmall Ball of Lint inſinuated in between the *Glans* and the Skin, Compreſſes dip'd in *Oxycrate*, &c.

Obſerve here in all Diſeaſes of the Yard, (and ſo in the uſe of theſe Medicines) it is very Commodious to lay it on the Belly, and keep it Suſpended in this Poſture by a ſmall Bandage, the Deſcription of which the Reader may find in its proper Place.

If the Prepuce be firmly united to the *Glans*, which is known by the Skin not being brought over, and the Probe paſſing between it and the *Glans*, the Operation will be Dangerous, and cannot be done without diſengaging the Prepuce from the *Glans*, and creating a great deal of Pain, and endangering a Mortification of the Yard.

When you judge the Caſe will admit of Operation, let the Patient ſtand or ſit as you like beſt. Draw the Extremity of the Prepuce as far back as you can, and command an Aſſiſtant to keep the Skin down at the Root of the Yard, (that the Inciſion may reach exactly to the bottom of the *Glans*) then introduce a ſmall Inciſion-knife, with a button of Wax on its point (to prevent wounding the Part) under the Prepuce, and cut thro' it. If one Inciſion be not ſufficient, make another on the oppoſite Side.

THE DRESSING. Lay on the Wound a ſmall Pledgit arm'd with ſome good Balſam, and over this a Compreſs in form of a Croſs, perforated in the midſt of the Paſſage of the Urine; and keep theſe on with a narrow Fillet near three quarters of an Inch Broad. This Fillet muſt be of a ſufficient length to cover the whole Yard by its Circumvolutions, have a hole made at one end, and the other end ſlit lengthways above an inch and a half. In applying this, paſs the two Tails or Slit end through the hole at the other end, then draw it as ſtrait as is Convenient; make ſeveral Circumvolutions ſpirally, till the whole Yard be cover'd, and the Fillet ſpent, and then faſten it by the two Tails.

If you judge it neceſſary to cover the Pledgit with an Emplaſter, make this of the ſame Figure, and let it be perforated in the midſt like the Compreſs.

For the Patient's eaſe, and to prevent the Inflammation of the Part, make a Linen Caſe

of an equal length with the Yard, and large enough to contain it with all its Dreſſings: Let this Caſe have a Perforation at the end for the Paſſage for the Urine, ſtitch two ſmall Straps at the lower end on each Side, and on the Upper, which may be long enough to be faſtned to the Band which goes round the Waſt to ſuſpend the Yard, and prevent Pain and Inflammation.

This caſe is of ſingular uſe to prevent painful Erection in Priapiſms, Virulent Gonorrhæas, Heats of Urine, and other Diſeaſes incident to this Part.

THE CURE do's not differ from the uſual Method, in all ſimple Wounds. For inſtance, if any Inflammation ariſe, have recourſe to Bleeding, cooling Clyſters, and a regular Diet, and when the Wound is incarned, Cicatrize it.

REMARKS.

Fabricius Hildanus, Cent. 4. *Obſ.* 8. Relates the Hiſtory of a young Man 22 Years Age, who from his Infancy had a Prepu of a monſtrous Size, contorted before in ſu a manner, that in the emiſſion of his Uri the ſtream was diverted on one ſide, a wetted his Cloaths. The Prepuce was n Membranous, as it ordinarily is, but a C nous Subſtance, and when he made Wat a great part of the Urine was detaind by to prevent which, he was obliged to dra the *Glans* out with his Fingers. This co ſtant handling made the Yard ſwell proc giouſly, and the inferior part common call'd the Suture, was exceeding Tenſe a Horney. The Author cut off this Prepu cloſe to the *Glans*, and the Patient was ha pily cured of this Inconvenience. Befo the Operation he had uſed all kinds of G neral Remedies, and now after it he appl ed Reſtringent Powders to ſtop the Bloo and in order to keep the Yard Streight, p a Pipe into the *Urethra.*

Of the PARAPHYMOSIS.

THIS Operation is the *Reducing the Prepuce over the* Glans, *when it is ſo far Retracted, that it cannot cover it without the help of Manual Operation.*

THE CAUSES. The Strangulation of the *Glans* is caus'd ſometimes by a ſimple Retraction of the Skin, which forms a Roll round the Yard, and at other times by an Inflammation of the Prepuce, from ſome preceding Cancer or Tumour, The Yard is often exceedingly ſwoln, and there are two or three Rolls one over another, which mightily intercept the Refluent Blood. When this happens, it is almoſt ever attended with a ſwelling in the lower part of the Prepuce, filled with a reddiſh Water, rarified and converted into a windy Matter by the heat of the Part.

THE SIGNS of a *Paraphymoſis* are a Tumour of the Yard and Rolls on the Prepuce. There is ſometime an obſervable ſwelling under the Prepuce, filled with a reddiſh Water, which riſes to ſuch a height, that except you Sacrifice deeply the tumefied place, to give a diſcharge to the Part, the Yard n ceſſarily Mortifies.

The OPERATION.

To reduce the *Prepuce*, you muſt uſe bo forefingers and both middle fingers. Pla theſe beneath the Rolls, formed by the tu mefied Prepuce, and with the two Thum compreſs the ſides of the *Glans*, to leſſen Bulk, and ſo draw on the *Prepuce*. Yo muſt not thruſt back the end of the *Gla* to make the *Prepuce* come over it; becauſe enlarges it ſelf, which hinders Reductio If the Inflammation be very great, and re ders this Method Impracticable, apply Co preſſes dip'd in *M. Lemeries*, or ſome oth Styptick Water, and when that is abate proceed as before.

THE DRESSING is the ſame with th uſed in the *Phymoſis.*

THE CURE. While the Diſeaſe remai the Method of Cure does not differ fr that of the *Phymoſis.*

Fabricius Hildanus informs us, he cured a *Paraphymosis* in very Plethorick Gentlemen by the following Method. In the first place, to keep the Patient's Body Cool, he enjoyned him to shun all manner of strong Drink, purged him with Cholagogues, and bled him copiously in the Arm; then he applyed a cooling Liniment twice a Day to the Region of the Kidneys, and the following Cataplasms as often to the suffering Part. ℞. *Barley Flower* ʒiv. *Powder of Roses* ʒij. *Pomegranate Flowers, and Cypress Nuts* ʒi. *Boil the Ingredients in Rose and Plantane Water. Make a Cataplasm with these, with the Addition of Yolks of Eggs, which is to be repeated twice a Day.*

These Applications being continued for several Days, the Pain abated very much. But a great erection happening one Night, obstructed the Cure, and the Prepuce violently compressing the *Glans*, all the Symptoms increased. Upon this he ordered him to forbear all Commerce with his Wife, not permitting him so much as to see her, purged him with Cholagogues, using outwardly the following Liniment. ℞. *Oil of Violets, Nenufar and Roses*, à ʒi. *Oil of Henbane by expression*, ʒij. *Camphire dissolved in Vinegar of Roses*, ʒi. *Mix these in a Mortar.* Besides this he gave him a Dose of *Laudanum* after Supper, after which he had better Repose than ordinarily, and the Erection was less troublesome. He persisted to give him *Laudanum*, which seldom exceeded two Grains, and outwardly to use the Liniment above described, and continue Cataplasms to the Part. The Swelling of the Yard abated soon, the Patient was cured, and had several Children after. But we must not omit here his caution to young Practitioners not to use the Cataplasm above mentioned, if the *Paraphymosis* proceed from impure Embraces, lest the Maliguity of the Distemper be repelled, and ill conditioned Ulcers ensue.

REMARKS.

Fabricius Hildanus, Cent. 3. *Obs.* 88. Tells us, a certain Smith of 40 years of Age, of a Melancholick Habit, had a small Wart on the extremity of his Prepuce, of the bigness of a Vetch. This Man being Marryed, found a great and continual Pain in this Excrescence upon the Embraces of his Wife, which obliged him to forbear knowing her for thirteen Years. The Pain increased by little and little, and at last degenerated into a horrible Cancer, as big as an Infant's Head. The whole Yard became a huge deformed Mass of Flesh, with several Ulcers on its Surface, through which the Patient discharged his Urine: The noisom scent of this *Cancer* was so great, that no one could endure to come near it. The Author made an Amputation of the Yard, and cured him perfectly.

Of LITHOTOMY *or cutting for the Stone.*

THIS Operation is *Incision made in the* Perinæum, *to extract the Stone through the Aperture.*

There is no Animal, except Man alone, infested with this Disease.

THE CAUSE. The Ancients did believe the Stone to be formed by the more Viscid and Fæculent Parts of the Blood passing off with the Urine, and setling in the Bladder. *Appocates* is perswaded, it proceeds from the more Terrestrial and heavy Parts of the Urine it self, which in too long a Retention of it, subside and sink to the bottom of the Bladder, like Sand in a Vessel of Water, and are there bound together by a thick slimy Matter, which compacted Mass, in process of Time encreases by the supply of new Materials. *Fernelius* conceives all Stones are first formed in the Kidneys, and fall from thence by the Ureters into the Bladder. This Opinion he founds upon an Observation, that he had seen no Person afflicted with the Stone, who had not before felt Nephritick Pains: This he farther confirms, by assuring us, that in most great Stones when broken, there is found a small Kernel in the Center, of the same Colour and Consistence with the Stone, and of a Figure agreeing to the

the Basin of the Kidneys, and inclosed in a Case of a different Colour from it.

* But the Modern Chymists seem to me to frame the most plausible Theory of the Formation of the Stone in Animal Bodies. These Gentlemen in Analysing the Urine by Fire, find in it two constituent Principles, *viz.* a Urinous Salt of a Volatil and Nitrous Nature, and pure Sulphur not unlike a Vinous Spirit. Now experience shews us, that upon mixing Spirit of Wine and Spirit of Nitre, a *Coagulum* will result in an instant; it is very easy and natural to suppose, that the like Principles existent in the Urine, leaving their Superfluous Phlegm, may unite, precipitate, and produce the like Effect.

Van Helmont does not think the Principles of the Urine alone is sufficient, for the Productions of the Stone; but adds a Petrifick Ferment, which he places in the Kidneys and Urinary Vessels, and reckons up as a third Agent, required to fix and coagulate the former. *There is no Transmutative principle in Nature*, says that Author, *without a Ferment; the Intestine Motion of the Particles of the Urine, is not the immediate Cause of its Corruption; its Putrefaction does not arise from any vitious Disposition of the Urine, but from a peculiar corruptive Ferment residing in the Kidneys, and other Vessels.* This he illustrates by the Similitude of a Vessel, in which any Acid Liquor has stood for some time, which coagulates and sours Milk; by Leaven which ferments Dough, and by the taint of a Musty Vessel, which alters and corrupts W or any Liquor put into it. This Fer which for its fineness and subtilty, some Analogy to the Odoriferous Steam suing from scented Bodies, he calls it or *Scent*; and of such a Nature he pre the Ferment is, to whose Petrefying I ence, he ascribes the Origin of the St and to confirm the existence of such a ment, he alledges this Experiment, tha rine will sooner Putrefie in a Vessel ta with it before, than in another whi Clean and New.

Having laid down the necessity of a p liar Ferment to perfect this Work, he ceeds to explicate the manner how it is formed. He assures us, he has found Spagyrical Examen of the Urine a Nit Spirit, which he terms the *Coagulator*, another Spirit not unlike Spirit of W Besides these, says he, There is in Uri Terrestrial Styptick Spirit, which by the sistance of the corruptive Ferment, is v tilized and imbibed by the Urinous Sp and these two uniting, excite and put Motion the Vinous Spirit, which before dormant in the Pores of the Urine. A after some conflict and mutual Action combine together, Præcipitate and Fo Stone in the midst of the Liquor. From h he infers, Stones are form'd in an Ins and grow gradually; though sometime he supposes they receive a considerable dition in a Moment of Time.

Ill Diet conduces much to the Genera of the Stone; for instance, all Spiri Drinks, Sharp Sauces, Milk-Meats, Fr Rye-bread, and the like; the latter u the account of their Foulness, and the mer upon the account of their Spirit Parts. The one furnishes Materials fo Stone, and the other Petrifick Ferment. ture too oftentimes as well as Diet, share in this matter, and the Stone pro from some Petrefying Seeds we inherit our Parents, and keep all our life after.

THE SIGNS. The Stones found in mane Bodies differ very much, as S Great, Smooth, Unequal, Flat, Round val, Square, Hollow, Light, Heavy, or Soft; some have Kernels, others some are White, Gray, Red, Black, Br or of other Colours; some adhere to

---

* *Our Author seems to be mistaken in representing* Helmont's *Opinion of the Generation of the Stone:* Spirit of Nitre *and* Spirit of Wine *stir indeed, and that with great Heat and Tumult, but after combine and compose a Temperate Liquor, or* Spiritus Nitri dulcis. *The true* Helmontian *Hypothesis, is that the* Duelech *or Animal Stone is formed by a Volatil Salt coagulated by a Vinous Sulphur; which conjecture he forms on the famous Experiment of mixing Spirit of Wine and Spirit of Urine both perfectly dephlegm'd (for the least Aquosity remaining, defeats the Tryal) both which Liquids instantly coagulate into a Hard, Dry Substance, which he calls* Offa Alba. *See* Helmont de Lithiasi.

rts, as the Sides, bottom or Neck of the ladder, others are looſe; ſome are in the idneys, *Ureters*, Bladder or *Uretbra*; ſome e included in *Cyſtis*'s, others not. In ſhort, ey are found in all parts of the Body.

If a Stone be lodged in the Kidneys, there an Inflammation, a violent and fixed Pain, which encreaſes if you preſs the Part with our Hand.) There is a Fever and Suppreſ-on of Urine, which diſtills drop by drop, d ſometimes is bloody, which proceeds om the fretting of the Veſſels by the grow-g Stone. Muddy and Purulent Urines, ſcover the Blood to be Extravaſated, and Abſceſs in the Kidneys. In this caſe Vo-iting, a Stupor of the Thigh and Leg enſue, d the Patient cannot endure to keep his dy Straight, the Teſticle of the ſame ſide rettracted into the Groin, and ſometimes r is Evacuated with the Excrement; for purulent Matter corroding the Gut, runs rough it, and paſſes off with the *Faces*.

The Communication between the Nerves the Kidneys and Stomach, and the Agi-tion of the Spirits in the Carnous Fibres the Stomach by the Inflammation of the idneys, are the cauſes of the Vomiting.

The Kidney lying on the Head of the uſcle *Pſoas*, compreſſes and inflames it, d this inflamed Muſcle preſſes the great unk of the Nerves, (which preſſes thro' Subſtance, and is diſtributed to the fore-rt of the Thigh and Hip,) and from hence oceeds the *Stupor*, becauſe the free influx the Spirits is interrupted. The *Pſoas* and ac Muſcle contiguous to it being infla-ed, (which two Muſcles are the Benders the Thigh) they cannot obey or follow e Motion of the Extenſors; and this is the ſon the Patient cannot keep himſelf E-t, without enduring vehement Pain. The ac Muſcle being united to the *Cremaſter*, mmunicates its Inflammation to it, which uſing a Contraction of the Fibres of the tter, the Teſticle muſt of neceſſity aſcend the Groin.

But after all, theſe Symptoms concurring not ſufficient to give us an abſolute aſ-rance there is a Stone in the Kidneys, ſince y may attend an ordinary Inflammation that Part, as in the caſe of Nephritick olicks.

We diſcover that there is a Stone in the Bladder, by a lively burning Pain in Piſ-ſing, and the Urine coming forth by Drops, and after divers intervals, as in the Stran-gury.

The Stone ſometimes ſtops the Neck of the Bladder, and ſometimes wholly blocks it up, according to the ſeveral Motions it receives from the Urine; and this is the cauſe of theſe Intermiſſions. When the Bladder is e-vacuated its ſides rub on the Stone, which grates them by its hardneſs and inequality; and from hence proceed great Pains after U-rining, and ſometimes drops of Blood. The Patient feels an itching in the *Perinæum*, which is continued to the extremity of the *Glans*, and obliges him to rub it: This ſometimes happens from ſharpneſs of U-rine. The weight of the Stone is often felt; and the irritation of the Fibres ſometimes cauſes an involuntary Erection of the Yard. The Urine is ſometimes White, ſometimes Bloody, Thick, Turbid, Muddy, and full of Sand.

When the Urine is very Clear, and there is Sand at the bottom of the Urinal, this is a ſign of a Stone in the Bladder. If the Stone extracted be polite and ſmooth, it is a ſign there are more, by rubbing againſt which this ſmoothneſs is cauſed.

If the Stone be very large, and reſts in the Neck of the Bladder, it becomes equal-ly large with its bottom. When it fixes to the bottom of the Bladder, and is contain-ed in a *Cyſtis*, the Patient may carry it all his Life-time without any notable Incon-venience, or the appearance of any of the ſigns above Recited.

Among the Diagnoſtick ſigns, there is none more certain than the Reſiſtance, of the *Catheter*, and the diſcernable Noiſe from gently ſtriking on the Stone.

The OPERATION.

This muſt not be undertaken, till you have a very good aſſurance of the exiſtence of the Stone in the Bladder.

To obtain a certainty of this, introduce your Finger into the *Anus*, and turn it to-wards the *Pubis*, then bend it, at the ſame time preſſing the bottom of the Belly with your other Hand, and if there be a Stone, you will feel it with your Finger. In Wo-

men

men or grown Maids, you muſt put the Finger up the *Vagina*, but in young Girls into the *Anus*.

But ſince hard Swelling and Schirroſities may impoſe on you in this way of Examen, the *Catheter* is to be relyed on as the moſt certain Evidence.

The firſt way of Searching.

Let the Patient ſit in a Chair with a Back, on which he may reſt or lie on his Back. Take the Yard by the *Glans* between the Thumb and Fore-finger, drawing it up Straight, compreſs the *Glans* a little to open the *Urethra*, into which introduce the *Catheter* with its Concave ſide downwards; when this is paſt in far enough for you to judge it is in the Neck of the Bladder, turn it quick and dextrouſly, and bring your hand over the Patient's Belly, and at the ſame time that you turn it, draw the Yard a little forward to keep the *Urethra* ſtreight and without Wrinkles, which may hinder the entring of your Inſtrument.

If after turning the *Catheter* you find it did not enter, leave the Yard, and introduce your Finger into the *Anus*, to guide the end of it into the Bladder. After this draw your Finger out of the *Anus*, and quit the Yard to ſtrike with the Inſtrument, turning it every way to hear what a noiſe it makes on the Stone. If it happens that the Stone ſwims in Urine, (for the Bladder muſt be full when you paſs the Inſtrument,) and you have reaſon to think this may hinder you from perceiving it, evacuate the Bladder by drawing out the Silver Wire in the *Catheter*, and after try as before.

Second way of Searching.

The following way ſeems more convenient, becauſe there is no need of turning the *Catheter*. Let the Patient lie on his Back, and holding the *Glans* between your Fore-finger and Thumb, raiſe the Yard up, inclining it a little on his Belly, hold the Rings of the Inſtrument on one ſide of the Belly, and compreſs a little the *Glans* between your Fingers to open the *Urethra*; then introduce the end of the *Catheter*, continuing to puſh it on gently, till it enters the Bladder. By proceeding this way, y ſave the trouble of paſſing your Hand o the Patient's Belly, and turning the Inſt ment.

The way of ſearching Women.

To Search a Woman oblige her to lie her Back, with her Buttocks a little rai and her Thighs divaricated; then ſepa the *Nymphæ* with the left Hand; and w the Right introduce the Inſtrument i the Neck of the Bladder, as in Men. W you are well aſſured there is a Stone, pare the Patient for the Operation by gen Remedies, Bleeding, Clyſters, and other per Medicines, to prevent any ill Habi Body, having a bad influence on the Wo after the Operation.

The OPERATION.

Place the Patient on a Table of a mi height, with his Back ſupported on the of a lin'd Chair, his Thighs open, his K drawn up to his Belly, his Heels applye his Buttocks, and his Hands reſting on ſide his Ancles. To keep him in this ſture, take a great Swathe three Inches b the middle of which is to be put abou Neck, and with each end of it the Arm to be faſtned to the Thigh and Leg o ſame ſide, each hand reſting on the ou of the Ancle of the Foot. This Poſtu exceeding convenient to hinder his ſtir to keep the Bladder ſteddy, and give li to the Muſcles of the lower Belly to per their Actions. After this place a Serva the Table behind the Patient, to keep down by preſſing on his Shoulders, i he ſhould attempt to riſe. All things prepared introduce a *Catheter* (not li former, but with a Hollowneſs or Fu along the convex ſide) into the Bladder the manner before deſcribed. The C thus introduced, muſt be held by a Se placed for that purpoſe on one ſide Patient, who muſt hold it with bo Hands, drawing up the *Scrotum* in manner, that the back of the *Catheter* thruſts out the *Perinæum*, may be be his two Fore-fingers, and leave ſpace e for you to make your Inciſion. The In

must be made with a sharp two edged Knife on one Side the Suture of the *Perinæum*, which must be greater or less, as you judge the Stone to be. To perform this dextrously, hold your Knife like a Lancet, and entring in the most prominent Part, plunge it quite to the *Catheter*, continuing to pass and repass it in the Furrow of that Instrument, till you have laid as much bare as you desire. This Caution is necessary, lest if the Incision were made at several times, there might be more than one Orifice.

In Men the Incision must be near two Inches and an half long, in Children less. It is better to have it too great, than to be obliged to enlarge the Wound with a Dilator, in case the Stone should prove too great to be extracted through the Aperture, because such violent Distention tears and bruises the Fibres of the Bladder. The Incision, if it be well made, must enter the *Urethra*; and you must not draw the *Catheter* out of the Bladder, till you have slip'd into its Furrow a Gorget or two Conductors, on which the *Forceps* is after introduced; for without the Direction of these, you may easily mistake and pass them aside, which too often happens; and whilst the Operator thinks he is in it, and seeking the Stone, feels it with his *Forceps*, instead of that pulls the Bladder and often tears it. When the *Forceps* is in the Bladder, open it, and gently search for the Stone, which (when found) hold fast. You must never close your *Forceps* in the Bladder, except when you have hold of the Stone, for fear of tearing its Membranes. When you would take hold of the Stone, open the *Forceps* with both Hands, and you may be assured you have hold of it, if its two Bows stand wide open.

If the Stone be oval, and you have hold of it lengthways, loose the Stone, and introduce your *Forceps* a second time, and take hold of it another Way. But observe here, the Wideness of the Bows alone is not a sufficient Evidence to assure you that you hold the Stone lengthways, since the same Appearance will be if the Stone be large; wherefore, to obtain a more full Information of this Matter, inquire of the Patient how long he has been afflicted with this Distemper, (for the older the Stone is, the thicker it grows) or if he feels a great Weight in his Bladder. You may farther judge of the Thickness of the Stone, and perhaps of its Figure too, by introducing the Finger into the *Anus*, and feeling it through the Gut. When you have hold of the Stone with your *Forceps*, do not draw it directly out, but turn your Fist to the Right and to the Left.

If the Stone happen to adhere to the Bladder, you must not obstinately resolve to extract it, lest you tear the Membranes; but if it be fixed to the Neck of the Bladder, it will be freed without Suppuration. You may conclude that it is fixed to the Bladder, if not being very big, it comes forth with Difficulty, and then you must proceed gently in extracting it.

If Stones are excessively large, as some noted in our Remarks, forbear extracting them, lest the Patient expire in your Hands. If you perceive the Stone is broken in extracting it, put in the *Forceps* again, and draw out the Fragments in the same Manner as the whole, and bring out the clotted Blood with the Spoon. If the Patient be very weak, remove him to his Bed, and put a Tent into the Wound, to prevent it from closing, and draw out the remaining Fragments after he has recruited his Strength.

If the Stone be so big that it cannot pass through the Orifice, dilate the Wound.

This Operation is called the Greater *Apparatus*, or Cutting on the Staff.

The Lesser Apparatus *in Men, or Cutting on the Gripe.*

This Manner of Operation is called Lesser, because it does not require so many Instruments as the former. To perform this, put your Forefinger into the *Anus*, to bring the Stone to the *Perinæum*; make your Incision on the Stone it self on one Side of the Suture, and extract it through the Aperture with a Hook. This Operation takes place when the Stone is not too big, and you can bring it to the *Perinæum* with your Finger.

The Way of Cutting Women.

Put your Forefinger and middle Finger up the *Vagina*, or into the *Anus* in young Girls;

with theſe two Fingers bring the Stone to you, compreſſing the Bottom of the Belly with the other to make it deſcend; put a hollow'd Probe or Director up the *Urethra*, which is to be held by ſome Aſſiſtant; then ſlide a Dilator on its Furrow, and taking out the Director, dilate the *Urethra* without cutting at all, and ſo extract the Stone with the Hook or *Forceps*. You muſt not put the Dilator too far up the *Urethra*, becauſe the Neck of the Bladder is ſhort in Women; and by this means you may happen to lacerate the *Sphincter*, and ſo cauſe an involuntary Efflux of Urine. This is called the Leſſer *Apparatus* in Women.

The Greater Apparatus *in Women.*

The Patient being put into and kept in the ſame Poſture with Men deſcribed before, introduce the Conductors into the *Urethra*, and between them ſlide a Dilator; then withdraw the *Conductors*, and ſo dilate; next introduce the *Forceps*, and drawing forth the Dilator, take hold of the Stone with it. If the Stone be too big to come forth, make a ſmall Inciſion to the Right and to the Left, to make way for it. Inſtead of the *Conductors*, you may uſe the Gorget, if you like it better.

The *Urethra* in Women dilates exceedingly, and it ſeldom happens that we are obliged to have Recourſe to Inciſion. Beſides, Women are more rarely attacked with this Diſtemper than Men; becauſe their *Urethra* is wider, ſtreighter and ſhorter, and the Urine more eaſily drives away that Sand which is lodged in the Bladder.

The Succeſs of the Operation may be gueſſed at from the quiet Repoſe which the Patient enjoys, the Freedom of Breathing, the Moiſture of the Tongue, no immoderate Drowth, Pain ſcarce ſenſible, little or no Fever, no Swelling in the Hypogaſtrick Region, and a Ceſſation of Inflammation on the fifth or ſixth Day.

Sometimes a Stone is voided out of the Bladder, and paſſes into the *Urethra*, where it lodges, and obſtructs the Emiſſion of the Urine. In this Caſe, if the Stone be near the *Glans*, preſs that with your Finger, and if it do not eaſily come forth, bring it out with the Extractor; if both fail, make an Inciſion on the Side of the *Urethra* to take it out ſo.

When the Stone is in the Neck of the Bladder, puſh it with the *Catheter*, or endeavour to bring it back by ſlipping the Finger into the *Anus*.

When the Stone is in the *Urethra*, if it be ſmall, ſtop the Paſſage with your Finger compreſſing the Yard beyond the Stone, then blow into the *Urethra* to dilate it, and puſh the Stone forwards with your Finger till you have brought it forth. This Way ſucceeds better in young Children than in Adults, their *Urethra* being more eaſily diſtended.

The Stone may ſometimes be drawn out by Suction. This ſucceeded well with Dr. *Muys*, who adviſed the Mother to ſuck the Yard of her Infant.

If a Stone be lodged in the *Urethra*, and cannot be got out by any of the Ways above mentioned, draw the Skin of the Prepuce upwards, and take the Yard between your Fingers to hold the Stone firm, compreſſing it a little, and making the Inciſion on the Stone lengthways on the Side of the Yard. When the Stone lies bare, preſs it out with your Forefingers, or pick it out with the Extractor.

THE DRESSING. When the Patient is cut, apply a great Compreſs on the Wound, and let ſome robuſt Fellow carry him to his Bed. If there be any Fragments of the Stone remaining in the Bladder, or you have Ground to think there are more Stones, put a Tent dip'd in ſome Digeſtives into the Wound, to prevent it from cloſing; and if there be a Flux of Blood, ſtop it with Aſtringents. If there be no Stone or Gravel remaining in the Bladder, put no Tent into the Wound, but a Pledget with ſome good Balſam, with an Emplaſter over that, and a Compreſs, both in the Form of a Horſe-ſhoe. The Dreſſing muſt be kept on with a Roller with four Tails, or the double T, ſuſpended with a Collar, and the Legs below the Knee bound together with a narrow Roller, to keep the Wound from gaping.

The Roller with four Tails is made with a Piece of Linen Cloth three Inches broad and an Ell long; ſlit this lengthways from both Ends to the Middle, leaving between four and five Inches in the Middle undi-

vided

ded: Apply the plain or entire Part on e Wound, and then croſs the two fore- oſt Tails, and faſten them to the Collar out the Ribs. (This Collar is a Band tched at both ends, which is put about e Patient's Neck, and hangs down to his elly.) Then paſs the two other Tails thro' e Collar, and bringing them back faſten em behind.

The ΠΓ or double T, is a Girth which es round the Waſt, with two Straps in e midſt ſown at ſome ſmall diſtance from ch other; apply the middle of the Girth hind, and tie its ends before, then bring e two Straps between the Legs, croſſing em on the Wound, and tie them before the Girth or Waſtband.

e Dreſſing for the Inciſion made on the Yard.

Apply a Pledgit dip'd in ſome good Bal- m, and over it an Emplaſter. The Ban- ge and all the reſt, is the ſame as in the rmoſis.

THE CURE. We have obſerved before, at in caſe there be reaſon to ſuſpect there Gravel remaining in the Bladder, you uſt not inſtantly heal the Wound, but put large Tent into it with ſome good Dige- ve, to give leave to the Gravel to purge ſelf through the Orifice. If the Wound e contus'd, you muſt Suppurate till a lau- ble Digeſtion appear, every day leſſening e Tent. But if after the Operation there e no Contuſion, it ſuffices to put in a Pled- t arm'd with ſome good Balſam, and dreſs twice every Day, till it be perfectly cured. he Patient muſt be fed with good Broths d Gellies, and muſt not eat any thing So- d for fear of a Fever, which would ob- ruct the Coalition of the Wound.

To prevent the Stone from being reprodu- d in the Bladder, the following Precauti- ns muſt be uſed. The Perſon who is Cut uſt lead a regular Life; that is, He muſt t eat to Exceſs, for fear of creating ill ices, the Stomach not being capable of od Digeſtion, when it is over-charged ith Meat. He muſt eat Wheaten Bread ell Baked, for Rye Bread containing an cidity, is apt to Coagulate the Humours, d produce the Stone. He muſt avoid all ſalt Meats, all ſorts of Ragouſts which ordinarily are High Seaſon'd: All theſe Aliments Heat, and are apt to petrefie that Glairy Matter, which is lodged in the Kidneys and Bladder. Milk Meats, Old Cheeſe, Hard Eggs, Sallets, Unripe Fruits, create ill Humours, which being mixed with Acids, acquire a coagulating Property. The uſe of Heady Wines and Beer, is dangerous. *Geſner* has obſerved, that if you put Sand into Stale Beer, it forms a Stone. Muddy Waters, and Waters of melted Snow and Ice are very Impure, and full of Bodies, which have a coagulating Property. Exceſſive Application of Mind, Debauches of Wine and Women, all violent Paſſions are very hurtful to Perſons who have any Diſpoſition to Gravel; all Exceſſes in any of theſe kinds ſharpen the Blood, and waſt its Unctuous and Balſamick Part. Too long Repoſe is Hurtful, becauſe the groſs Feculent Matter ſubſiding, and not being diſperſed by Motion is collected together, and ſoon coagulated by an Acid.

For theſe Reaſons the Patients Diet muſt conſiſt of ſuch things as are ſweet and eaſy of Digeſtion, as Veal, Lamb, Fowl, *&c.* or Broths, in which the cooling Plants are boiled, as *Succory*, *Sorrel*, *Parſly*, *Spinage*, or others of the like Nature.

White-wine boiled with a Moiety of Water, *&c.* Sleeping and Waking muſt be Moderate. The Patient muſt not ſleep on his Back, for this poſture is Heating. The Body muſt be kept open with Clyſters, if Nature does not act her Part, and gentle Purges given at proper Times, of *Whey*, *Manna* and *Caſſia*.

Thoſe who are ſubject to Nephritick Cholicks, may be cured by Emollient and Lenitive Clyſters made with *Mallows*, *Marſhmallows*, *Milk*, *Sugar*, and *Oil of Sweet Almonds*. Theſe are Preparative to Diureticks, ſuch as Ptiſans made with *Salt-Peter* Refined ʒß. Diſſolved in a Decoction of *Reſt Harrow*, and *Dog's Graſs*. There is not a more excellent Diuretick than *Turpentine*, ʒß. made into a Pill. To harden it, it muſt be boiled in ſome Diuretick Liquor, as Turnep Water, and ſo made up. To the part affected, apply Fomentations, ℞ *Roots of Marſhmallows*, ʒß. *Mallows*, *Melilot*, *Chervil and*

Camomil together three Handfulls, *Linſeeds*, *Parſley Seed*, a ℥i. Boil the Ingredients together, and apply the Cataplaſm to the Part.

Baths made with Emollient Herbs, are very uſeful in Nephritick Pains, and Broth with *Oil of Sweet Almonds*, ℥i. given to the Patient in the Bath. You may likewiſe give *Turpentine Pills*, or a Dram of the Powder of *Millepedes*, both which are proper to expel Gravel by Urine.

If in Nephritick caſes the Patient Vomit, give him the following Powder. ℞ *Sperma Ceti*, *Crabs Eyes*, ʒß. *Cinnabar of Antimony*, ℈i. *Volatile Salt of Amber* iv. gr. *Laudan.* gr. iß. *Trochiſc. Alkekengi with Opium* ℈ß. Mix theſe for four Doſes.

Mr. *Boyl* in Nephritick Pains, commends *Caſtile Soap diſſolved in old Oil of Wallnuts*, adding *Oil of Ginger* three or four Drops. This is a good Diuretick.

REMARKS.

There is in the Hoſpital of *the Charity* at *Paris*, a Stone weighing 51 Ounces, taken out of the Bladder of a Prieſt after he was Dead, who had been cut to no purpoſe, the Stone being too large to be extracted.

There was found in the Bladder of a certain *Engliſh* Knight, who died at 82 years of Age, a Stone which weighed 25 Ounces and a half, the Urine had formed a Chanel in it, through which it paſſed into the *Urethra*. This Chanel had one Hole in the place where the *Ureters* enter the Bladder, and another at the bottom of the Stone.

Hildanus Centur. 1. *Obſ.* 69. relates the Hiſtory of a young Fellow who had omitted by the Yard 300 Stones of different Colours, ſome as big as Nuts, others as large as Cheſtnuts. He voided all theſe in two Years time, with great Pain, accompanyed with Blood; This young Man died of the Plague.

The ſame Author relates, *Cent.* 4. *Obſ.* 50. He had found the Bladder of a Man divided into two Bags, each Bag containing ſix Stones about the bigneſs of Galls.

In *Centur.* 4. *Obſ.* 5. He mentions a Stone which he had taken out of the Bladder of a young Man of 20 Years of Age, which weighed 22 Ounces. It ſeemed to conſiſt of ſeveral ſmall Stones cohering, and had the Figure of a Cupping-glaſs. The Patient d in the Hands of the Operator.

In *Centur.* 6. *Obſ.* 57. He tells us he ha Stone by him, which he had extracted of the *Scrotum*, which weighed 8 Dr when it was firſt taken out, but at pre weighs no more than five.

In the *Miſcellanea Curioſa*, *Obſ.* 44. T is a Hiſtory of a Man of 64 Years of A tormented with a violent Pain in the *chium*; He had an *Aſthma* to that degree could not breath except he kept his Head rect, had the Jaundice beſides, and in died of theſe Diſtempers. Upon oper the Body, two Tubercles were found in Lungs, and 72 Stones about the bigne Peas, of a blackiſh, yellow Colour in Gall-Bladder, and *Porus Choledochus*. In Gall-Bladder of a certain Count of 70 Y of Age were found ſeveral Stones, the gr eſt of which weighed 14 Drams, and leaſt 4. In a Woman of 63 Years of A the Gall-Bladder was filled with ſev greeniſh Flints, larger than Beans.

Five Stones, the leaſt of which was as as a Nut, were taken out of the Gall-B der of Pope *Urban* the VIII. *Borrichius* us, he had found in the Bladder of a man, above ſeventy Stones of an irreg Figure, ſoft to the touch, which melte warm Water. *Helmont* relates, that he found Stones in the Gall-Bladder of ſev Animals. *Bartholin. Cent.* 1. *Hiſt.* 34. us that a certain Perſon very much ſub to Gravel, falling into a prodigious Sw evacuated a great quantity of ſmall S that way.

In the *Miſcellanea Curioſa*, *Obſ.* 46. I account publiſhed, of a certain Ox ſeen to be more ſtupid than any of the Reſt, clining his Head to the Ground, often l down, and nodding in a Paralytick M ner, who being obſerved to waſt away, killed by his Owner. The Brain was fo petrified, and as hard as Marble, all th maining part of his Body ſound. The L neſs and Decay in this Animal, did do leſs proceed from a Defect in the Diſtr tion of the Spirits from the Brain, to th veral parts of the Body.

Obſ. 27. Contains the Hiſtory of a man, who for ſeveral years being torm

with cruel Nephritick Pains, made U-
ne ſo thick that it Roped, and ſometimes
t ſuch an extream Chilneſs, that ſtand-
g before a violent Fire Naked, ſhe could
t perceive the leaſt Heat, though her Skin
ere Scorched. This Woman dyed with
reſive Pain, and her Kidneys were found
rrified, and as ſolid as Alabaſter.

Obſ. 65. A certain Perſon of 72 Years of
ge, of a Phlegmatick Habit of Body, was
tacked with a ſuffocative Catarrh, and a
eat Suppreſſion of Urine: A large Aper-
re was made in the Vein of the Arm, out
which ſix Ounces of Blood were drawn,
gether with which came out Four ſmall
ones, which made ſo great a noiſe in fall-
g into the Porringer, as to be heard by
e ſtanders by, theſe were of a yellow Co-
ur, a little inclining to Red, and of the
me bigneſs with the Gravel uſually void-
d in Urine. The Patient was ſoon cured
his Catarrh; but the Difficulty of Urine
mained, and ſoon after he died of an A-
oplexy.

Obſ. 66. Relates the Hiſtory of a Woman
f 33 Years of Age, of a Sanguine Com-
lexion, who being near the time of her De-
very was ſuffocated with a Catarh. In the
ſuperior part of the Liver was found a great
Abſceſs or Maſs of Matter contained in a *Cyſtis*, ſo hard and ſtrong, that it could not without great Difficulty be cut with a good Pair of Sciſſars. This was filled with a Black reddiſh Subſtance, very Glutinous, not unlike Birdlime. This Glew was ſo Tenacious, it was difficult to get it from the Fingers. In the midſt of this was lodged a Stone, about the bigneſs of a Pullets Egg, which being divided in the midſt, ſparkled as if it had been filled with Nitre. This Stone was much harder on the Surface than within, and void of all perceptible Scent.

Obſ. 107. Relates that a Widow of a certain Shoomaker, had for the ſpace of 16 Years, a Stone in the left Kidney, who by the Torment which ſhe ſuffered, was waſted to that degree, ſhe ſeemed a living Skeleton. She had a great *Stupor* on her left Thigh. This Woman took every day for ſome time, a *Decoction of Speedwell* in great Quantity. This innocent Remedy brought the Stone from the Kidneys into the Ureters; whilſt it was detained there, ſhe found the Pain intolerable, and expected nothing leſs than to be killed by it. She continued the uſe of her Medical Drink in greater Quantity, and ſo brought it down into the Bladder, and thence by the help of the ſame Drink and Fomentations, at length brought it quite forth.

Of the PUNCTION *of the* PERINÆUM.

THIS Operation is an *Aperture made in the* Perinæum, *to let out the ſuppreſs'd Urine.*

THE CAUSE. The Suppreſſion proceeds from ſome great Inflammation, or ſome Carnoſity, Fungus, Schirrus, or Ulcers, which ſtocks up the *Urethra*.

THE SIGNS. There is great Pain and Inflammation in the *Perinæum*, the Urine is retained, and the *Catheter* will not paſs the Duct to let it out.

The Operation muſt only be undertaken when milder ways fail, ſuch as Injections, the *Catheter*, or Cataplaſms. In this caſe put the Patient into the ſame poſture as in cutting for the Stone, and without uſing the *Catheter* (for we ſuppoſe that will not enter into the Bladder.) Make an Aperture with a Lancet or an Inciſion Knife, large enough to put in a *Canula*, whoſe extremity may paſs into the Bladder. This muſt be left in the Wound for the Urine to paſs through, till the Inflammation be over. After the *Canula* is drawn out, dreſs the Wound.

THE DRESSING. This is exactly the ſame with that deſcribed in cutting for the Stone.

THE CURE of the Inflammation of the *Perinæum*, conſiſts like others of the like kind in applying Diſcutients to the Part, taking Internally Volatile Medicines, *v. g.* ℞. *Cardans Water*, ℥i. *Water of Elder Flowers*, ℥ij. *Crabs Eyes*, ℥i. *Diaphoretick Antimony*, ℥ß. *Sper-*

m a Ceti, ℈i. *Laudanum* gr. 11. *Sugar-candy*, ℥ij. of which Mixture the Patient at ſeveral times muſt take ſome Spoonfuls.

Cataplaſms are made of Roots of *Aſparagus*, *Bryony*, *Hemlock*, *Flowers of Camomil and Elder*, with *Camphire* and *Sulphur*. Compreſſes dip'd in *Spirit of Wine Camphorated*, may be applyed. If theſe prove ineffectual; ſuppurate the Wound with emollient Cataplaſms made with *Lily Roots*, *Bryony*, *Marſhmallows*, *Brank-urſin*, *Pellitory*, *Chervil*, *Mullin*, *Camomil*, *Melilot*, *Figgs*, &c. After the Ingredients are boiled, pound them in a Mortar, adding *Oil of Lilies* or *Roſes*, and apply the Cataplaſm hot to the Part.

When the Suppuration is over, cleanſe the Ulcer with ſome deterging Balſam. Sweeten the Blood with Volatile Medicines given Internally, ſuch as *Diaphoretick Antimony*, *Crabs Eyes*, *Volatile Salt of Hartſhorn* and *Vipers*, and an infinity of others to be found in M. *L' Emery*, or other good Chymiſts. Theſe Volatiles may be given together, or ſeparately, in ſome proper Vehicle, as *Carduus Water*, *v. g.* of the Powder ℥ß. in a Glaſs of the aforeſaid Water.

If the Ulcer be in the *Urethra*, which may be diſcovered by the Suppuration, make your Injections of Mundifying Ingredients infuſed in Hot Wine.

REMARKS.

In the Chamber of *the Bleſſed Queen* the *Hotel Dieu*, there was a Big-bellyed W man ill of the Small-Pox, her Fundam was rotted from the *Os Pubis*, to the *Os crum*, notwithſtanding which, ſhe was livered of a living Child, who died ſo Hours after, as did the Mother not long ter the Delivery.

Bartholin. Cent. 2. *Hiſt.* 52. tells us tha Man of 49 Years of Age, had a Suppreſſi of Urine cauſed by Straining in Mounti his Horſe, a Fever enſued with a contin Hiccough, a Pain and Swelling in the Gro Upon inſinuting a Pipe into the Bladder Urined, the Swelling of the Belly ſun and the Pain was allayed; but the Pa ſometime after returning, the Patient die Upon opening the Body, there appeared t Tubercles of the bigneſs and figure of t Teſticles, which perfectly ſtop'd the Duct the *Urethra*. Theſe in all points perform the Office of a Valve, opening ſtom wit out inwards, if the *Canula* were thruſt gainſt them, but ſtop'd the Paſſage fr within outwards. Theſe Tubercles conſi ed of a firm white Fleſh, without any P rulent Matter; The Right was larger a ſomething more brown than the Left. T lower part of the Bladder was a little Mo tified, the Patient made a Purulent Wat and the *Colon* adhered ſtrictly to the *Periton um* on the right Side.

Of the FISTULA in ANO.

THIS Operation *is an Inciſion made into the* Anus, *to lay open an Ulcer in that Part.*

THE CAUSE. A Fiſtula is a *Callous*, *Sinuous*, *Deep Ulcer*, *with a ſtreight Mouth or Entry*, *opening into a more Spacious Bottom.* Theſe Cavernous Ulcers full of Partitions, are formed by the ſharp and ſaline Parts of the Blood.

The *immediate* Cauſes of *Fiſtula's* in this Part, are *External* and *Internal*. The *External* are Contuſions, Impure Embraces, Falls, Leeches ill applyed, *&c.* all which obſtruct the Circulation, detain the H mours, and create an Abſceſs, apt to deg nerate and become Fiſtulous. The *Intern* Cauſes are Abſceſſes, proceeding from O ſtructions, Inflammations, Ulcers, Piles, & The *Anus* is more ſubject to *Fiſtulas*, th any other part in the whole Body. Th proceeds from the great quantity of F with which the *Inteſtinum Rectum* is loade from the Evacuation of the *Faces* here (th being the common Sink, where all the Fil of the Body is brought down to be carry off) from its continual Humidity, and n

nerous Veſſels, as Branches of the Hypogaſtrick Arteries and Veins, a Branch of the *Aorta*, another of the inferior Meſenterick Artery, the Hæmorrhoidal Veins, the vaſt number of Lymphaticks;) and laſtly, from its Glands which ſeparate a White, Glairy, viſcous Liquor. Some or more of the Cauſes above-mentioned, hapning to meet with a part thus diſpoſed, it is no wonder to find a *Fiſtula* ſoon formed.

Fiſtulas differ much, and are to be diſtinguiſhed by the following Remarks.

THE SIGNS. If the Fiſtula be in the fleſhy Parts, the *Pus* is White, Turbid and Viſcous. If in the Nervous Parts, the Patient has Acute and very ſenſible Pains, and the Humour is Serous and Sharp. If it attack the Veins and Arteries, it works thro' them by its Acrimony, and the Matter which comes away, reſembles the Waſhings of Fleſh. If the *Fiſtula* emit a Thin, Clear, Sharp Humour, it is a mark it has invaded the Bones, and they are Corrupted. In this laſt Caſe Calloſity is greater, which proceeds from the Exceſſive Acrimony and Saline Parts, able to Corrode and Cariate ſo ſolid a ſubſtance. How the Saline Parts form Calloſity, may be conceived by the like Effect which Salt has, when ſtrewed upon Pork which it hardens, whilſt the Humidity of the Fleſh diſſolving it, its parts like ſo many Stakes enter and hinder the Motion. This explication is plauſible enough, and may be admitted by thoſe who place the Hardneſs of Bodies in the Repoſe of their Parts.

Recent *Fiſtula's* in Perſons of a good Habit of Body, are curable if the Part concern'd will admit the Application of proper Remedies. But when Inveterate or in ill Bodies, or invading Parts neceſſary to ſupport Life, as the Bladder, Guts, *&c.* where no Application can be made, are deſparate.

Fiſtula's are of different ſorts; ſome pierce the Gut without any outward Orifice. Others open outwardly, without entring the *Inteſtinum Rectum*. Theſe two Species are termed *Incompleat*. Some open within and without the Body, and theſe are called *Compleat*. There are ſome which have divers Cancers, all opening into one Cavity.

If the *Fiſtula* pierces the Gut only, there is a ſmall Tumour and Inflammation Viſible, without the *Pus* flows out of the Gut, there is Pain, Excoriation, Itching, and a *Teneſmus* cauſed by the Acrimony of the Matter, which irritates the Part, and ſollicites the Patient to go to Stool without any Neceſſity. If it open outwardly, the Orifice is diſcerned by the Eye, and the Probe. No *Pus* comes from the Gut, and none of the preceding Signs appear. The Sinuoſities and Caverns are found by the Probe, by the Pain and Matter of various Colour and Condition. From conſidering the Signs, we proceed to.

The OPERATION.

The Operation is the ſame, of whatever Nature the *Fiſtula* be. Place the Patient on the brink of his Bed, with his Thighs ſtradling; If the Fiſtula open outwardly, enlarge the Orifice to introduce the Inciſion-Knife with its Probe. This Knife muſt be crooked and ſlender, and the Probe Long, pointed at the End, and made of well temper'd Metal, to prevent the danger of its breaking in the Operation. Put the fore-finger of the left Hand up the *Anus*, introduce the Knife into the external Orifice of the *Fiſtula*, and when you feel the Point of the Probe on your Finger, perforate the Gut with it, and then draw one end of the Probe with your Finger, and the other with your Hand, ſo make the Inciſion quite thro' at one Slaſh. Obſerve before you uſe this Inſtrument, to have its Edge cover'd with a fine thin Silver Chape or Sheath, which keeps it from hurting the Patient when it is thruſt in, and is to be taken off when the Knife is in the Wound, before the Inciſion be made.

If the *Fiſtula* pierce the Gut only, and the Swelling, Pain, Inflammation, or other external Marks of the bottom of the *Fiſtula*, are very remote from the *Anus*, forbear the uſe of the Knife, which would make the Wound too Large and Painful, and make the Aperture with potential Cauteries only.

For this purpoſe lay an Emplaſter over the bottom of the *Fiſtula* of the ſame length with the Orifice deſign'd, apply the Cauſtick bruiſed on the Part, firſt wetting a little the Place, then cover it with another Emplaſter to keep it on the Part. The lower

per-

perforated Emplaſter, prevents the Cauſtick from acting on the adjacent Parts, or ſpreading farther than you Deſign. The time of its lying on, muſt be proportioned to its Strength. After which the Eſcar is to be ſeparated with the Lancet, and the Operation performed after the manner above deſcribed. When the Operation is over, ſearch with your Fore-finger whether there be any Sinus's, which if you find, open the Sciſſars, and cut the Communications; without which caution the Wound apparently cured, will infallibly Relapſe. Here you muſt be careful of cutting Arteries which may lie in the Way; in caſe of ſuch Accident, ſtop the Blood with *Lemery's*, Styptick Water, or ſome good Reſtringent Powders, of which you may find an infinity in Authors.

If any Surgeon in the Country ſhall be called to perform this Operation unprovided with the Inſtrument deſcribed, he may uſe his Sciſſars in this manner. Let him take an Iron Wire ſharpned at the end, and paſs its point through the enlarged Orifice, and thruſt it into the Gut, having introduced his Fore-finger into the *Anus*. Then let him draw the point outwards through the *Anus*, and when it is come far enough out, bring the ends of the Wire together, and with the left Hand draw the Fleſh to him, enter one Blade of the Sciſſars or the crooked Knife, and at once cut through all the Fleſh. This method is uſeful in defect of other Conveniencies, or in caſe the *Fiſtula* lie ſo deep in the *Rectum*, you cannot without difficulty introduce the Knife together with its Probe. In this Operation, you muſt be careful to avoid cutting the Sphincter quite through, leſt the Patient ever after ſuffer an involuntary Emiſſion of the Excrement.

THE DRESSING. Fill the Wound with Doſſils arm'd with good Digeſtives, and ſo diſpos'd, that the Medicines may have their Effects equally on all its Parts, over theſe lay Pledgits with more Digeſtives, and af the Cavity is filled, cover all with an E plaſter, and over this lay a Triangular Co preſs, which muſt be of this Figure, t one ſide may paſs between the two Buttoc The Dreſſings muſt be kept on by the R ler with four Tails faſtned to the Collar, with the ſingle or double T. Theſe are very ſame with thoſe uſed in the Operati of cutting for the Stone, where the Rea will find them deſcribed, which we ſh omit here to avoid unneceſſary Repetitio

THE CURE. Good Digeſtives muſt apply'd twice a Day, to remove all Call ties. If theſe fail of effecting, lay a C ſtick on the Indurations, and when the geſtives are laudable, mundifie the U after the uſual Manner.

Fabricius Hildanus, Cent. 5. *Obſ.* 80. lates a Cure of a *Fiſtula* ariſing from the managing a Tumour of the Parotid Gla A certain Perſon had an Abſceſs under right Ear, which by degrees degenerated to a *Fiſtula*, which had been three Years ſucceſsfully in the Hands of ſome Barb till he was called to it. He found it Ca nous with two *Sinus*'s at the leaſt under Skin; the firſt of theſe extended upw towards the *Cranium*, dividing again two other; the ſecond went downw in its Deſcent, following the Courſe o Jugular Vein, all theſe Cavities were l with a *Callus*. In the firſt place he pre bed the Patient an exact order of Liv purg'd him twice, conſumed the Skin w covered the *Fiſtula* with a Cauſtick, ning the Separation of the Eſcar with *licon*. The Calloſities in the bottom he wiſe conſumed with another Cauſtick, the Addition of his *Angelick Powder*. theſe remov'd, he proceeded to Mundif Wound with the ſame Powder, whi Extolls for its wonderful Efficacy in ſuming ſuperfluous Fleſh, advancing growth of the ſound, and procuring Coagulation of Wounds.

Of the Operations to be perform'd on the Anus. *From Mr.* Dionis, *and of cutting for the* Fiſtula in Ano; *with the Hiſtory of that of the* French *King's, perform'd by* M. Fælix, *chief Surgeon to his moſt Chriſtian Majeſty.*

THE *Anus* is afflicted with as many or more Diſtempers, than any other part of the Body, by reaſon that being the Common-ſhore through which paſs all the greateſt Impurities, and as it were the Sink of all the Filth of the Kitchen, it muſt needs be frequently irritated and ſubject to Sediments, by reaſon of the Acrimonious Humours determined to this Part. Some of theſe Diſeaſes are cured by Remedies which are either general or particular, and others by Manual Operation: Which laſt are thoſe I now propoſe to Treat on, and at the ſame time diſplay the Operations which they Require, which I reduce to Five; the firſt is that of piercing the *Anus* when clos'd, the ſecond the reducing the Gut when fallen, the third is curing the *Condylome*, *Criſtæ*, *Rhagades* and *Fundi*, which happen to this Organ, the fourth is the cure of the *Hæmorrhoids* or *Piles*, and the fifth, the opening of a *Fiſtula* in the *Anus*.

Some Authors tell us, that the Fundament may be two ways clos'd, either naturally, as when a Child comes into the World without any Aperture; or accidentally, when through negligence, the ulcerated edges of that part are left to glue together, and cicatrize. I have ſeen Children born with their Fundament clos'd, but I never found any who had that part accidentally clos'd, but on the contrary believe it to be impoſſible, by reaſon that the great Excrements which daily iſſue out at it, oblige it to open to make way for them, not allowing a ſufficient time to the ſides of the Ulcers there form'd to join together: Wherefore looking on this ſort of cloſure as imaginary, I ſhall only treat of that which is Natural.

'Tis not generally perceiv'd the firſt Day of the Child's Birth, that it has this Defect; but the ſecond or third, when it has not foul'd it ſelf, we muſt examine the Cauſe of it: The Chirurgeon muſt remedy it as ſoon as diſcover'd, becauſe the Child will be Loſt, if we don't provide a ſpeedy iſſue for its detain'd Excrements: Theſe very Excrements will ſometimes facilitate the Operation; for preſſing on the Membrane which ſerves to hinder their coming forth, they diſcover the Place where the Aperture is to be made. If this Membrane is thin, 'tis eaſily pierced; but if thick and ſtrong, as I met with it in a Patient, where the Mark of the *Anus* ſcarcely appear'd, more Pains are requiſite to make the neceſſary Hole there. To this end we may make uſe of the *Lancet*, or the *Inciſion-Knife*, thruſting it in 'till we find iſſue out the *Black Matter* called *Mœconium*, which Infants void immediately after their Birth. This Aperture is to be made by two Inciſions, which croſs one another, in the place which is to be the middle of the Aperture of the Fundament, which will the more diſpoſe it to take the round Figure of the *Anus*, than if it were perform'd by a ſingle long Inciſion. After allowing the Child time to Evacuate, we thruſt in the *Lint Tent*, charged with the Yelk of an Egg, beat up with a little Oil; the bulk and hardneſs of the Tent is to be ſo proportion'd as not to give much Pain, and to leave liberty for the freſh Excrements, to puſh forth in caſe there

be any to come out: Then are to be applied the *Pledget*, and the *Plaſter*, next to that the *Bolſter*, and above that the other *Bolſter*, the whole being faſten'd and kept on by the *Band* ſhap'd like a T.

'Tis needleſs to make uſe of a hollow'd Tent, as we do in caſe of other Apertures, becauſe there is no reaſon to fear the re-union ſucceeding. If on the firſt day we happen not to have made the Aperture large enough, nor of the Figure which it ought to be, it muſt be amended the next; and to perfect this Operation, with the point of the Inciſion-Knife, we diſengage and unbridle each fold or wrinkle of the Circumference of the *Anus*, cutting the Membrane which cauſes the cloſure in the ſhape of a ſmall Roſe, that nothing may remain which may for the future hinder it opening as much as the great Excrements Require, in order to their Paſſage out, and to ſhut exactly after their Evacuation.

'Tis needleſs to prepare the *Apparatus* before the Operation, becauſe in the firſt place 'twould be to loſe thoſe Moments which ought to be employ'd in relieving the ſuffering Infant, and the Interval which neceſſarily falls betwixt the Operation and the Dreſſing, in order to allow the Child time to avoid the *Mæconium* and detain'd Excrements, is ſufficient for this Preparation.

This Inteſtine ſometimes falls, and comes out in Children when they are ſuffer'd to Cry too much, and in adult Perſons which may have ſtrain'd themſelves on ſeveral Occaſions: When it turns out like the Finger of a Glove, and comes forth more or leſs, according as the Strain was: I have ſeen it come out half a Foot in Length, and as thick as the Arm. This Accident happens to thoſe who have a Stone in the Bladder, by the ſtraining Efforts which they make to Piſs; and frequently during the Operation for the Stone, this Inteſtine not only violently thruſts out the Excrements which it contains, but comes out it ſelf, being ſtimulated by the Pains which the Patient endures in that Operation, which ought not to hinder the Operator from continuing his Courſe; for after that the Stone is extracted, he eaſily reſtores the Inteſtine to its Place. The griping Pains caus'd by the *Diſentery* frequently force out this Gut, and at other times it is driven out by the grievous Pains of a hard Labour: To theſe extraordina Efforts alledged as the cauſe of this Indiſp ſition, Authors add the Weakneſs or Pa of the Muſcles call'd the *Erectors of the An* as alſo the exceſſive abundance of Humi ties which ſoak into theſe Parts.

A Chirurgeon cannot miſtake this D ſtemper, ſince the firſt glance of the Eye di covers it; wherefore without loſing a time in examining the Patient, or the Sp ctators, from what cauſe it proceeded, muſt prepare himſelf to reduce it with Speed, to which purpoſe he is not to tro ble himſelf to diſpoſe the *Apparatus*, 'till has reſtor'd the Gut to its Place. If he c quickly get ſome hot Wine, with that he to waſh the part of the Gut which is com out with a Linen Cloth or a Spunge, the compreſſing it gently with his Finger, a thruſting it back he cauſes it to re-ente which is ſometimes very eaſily done. Tho ſubject to this falling out, may themſelv perform the Reduction, as thoſe which hav Deſcents, often reduce them with leſs Pa than others do. Some Children by the continual crying render this more difficul in which caſe the Chirurgeon takes the tim when the Inteſtine contracts it ſelf by a *Ver micular Motion* which is proper to it; fo his efforts would be Vain, if he ſhoul ſhove it back at the time when 'tis enlarg by its *Periſtaltic Motion*.

The greateſt difficulty of this Operation i not the returning of this Gut, but the re taining of it in its place when reduced; i order to which, as ſoon as the Reduction finiſhed, we lay on the *Anus* a *Bolſter* whic we cauſe ſome Perſon to hold, whilſt w prepare the *Apparatus*, for fear the Inteſtin ſhould ſtart out in the Interim.

The *Apparatus* conſiſts in only two *ſtron thick Bolſters*, one of which is a long one, t be plac'd betwixt the two Buttocks, and th other a ſquare one, to be kept on the *Anu* with the *Bandage* like a T Mark'd, whoſ top is ſlit into two Parts, in order to paſs a long the ſides of the Purſes of the Teſticles and to be faſten'd to the circular Bandage which ſurrounds the Body. The *Bolſters* ar to be wetted in an *Aſtringent Wine* prepar'd with *Wormwood*, *Galls*, *Pomegranate-ſhells*, *Allom*, and the *Green Fruit of Guaiacum*, al boild in red Wine. The Wine muſt b ready

ady at Hand; for if the Gut falls out a-ain at the moment the Patient goes to Stool, efore 'tis reduc'd it muſt be waſh'd with is Wine, which is to be heated every time s us'd. This Remedy is excellent for the ure of theſe fallings out of the *Rectum*; r at the ſame time that by its aſtringent uality, it cloſes the Fibres of that Gut, its heat it fortifies the erecting Muſcles.

What is moſt troubleſome in theſe ſorts Infirmities is, that every time the Pati-nt goes to Stool the Inteſtine falls out a-ain, or at leaſt is ready ſo to do: To avoid hich, we order the Patient to ſit at that me on a narrow diſtance betwixt two oards, that the Buttocks being thereby os'd the falling out of the Inteſtine may be revented; he muſt extend his Legs, and train as little as poſſible in the diſcharging his Excrement. We may alſo on a ſingle lank make a hole about the Diameter of a alf Crown, and around it place a ſmall oll or Cuſhion, which comprehending the ircumference of the *Anus*, will hinder the lling of this Gut when the Patient goes o Stool: If it be a Child, its Mother, or e who has the care of it, by clapping two her Fingers to the *Anus* when it voids its crements, will prevent the frequent fall-g of the *Rectum*: And to conclude, all e times which it comes out, it muſt be aſh'd with the Wine above-mentioned, en reſtor'd, and always kept up with the *andage*, and a *Bolſter* moiſten'd in the ſame *ine*, which will accuſtom it to continue in s Place, as I have ſeveral times ſeen.

Some Authors are cruel enough to adviſe e Application of ſeveral actual Olive-ointed cauteriſing Irons red Hot around e *Anus*, to cauteriſe the circumference of at Part; they pretend by theſe means to onſume the Humidity which relaxes the rectory Muſcles, and hope that the cicatri-ings which remain, cloſing the *Anus*, will inder its falling down again. I never ſaw is Operation practis'd, and I believe if a Chirurgeon ſhould be inclin'd to perform , he would not find a ſingle Perſon who ould not oppoſe it, and with Juſtice, nce 'tis poſſible to cure Diſeaſes without aking uſe of red Hot Iron, which ſtrikes horror even into thoſe who do but hear it ention'd.

Monſieur *Blegny*, who did not want for Inventions, would have us detain the Inteſtine in its place with a *Turky-Cock's Craw*, which is to be blown up in order to ſwell its Bulk after 'tis introduc'd into the *Anus*, which hinders that Gut from deſcending. But as this Machine muſt be taken out and put in again every time the Patient goes to Stool, and it being on thoſe Occaſions that the Inteſtine falls down afreſh, I take it to be of very little uſe, and very inconvenient to be uſed, and that the rather becauſe Bolſters and Bandage anſwer the ſame end, and are not ſo troubleſome.

The Word *Condylomæ* is deriv'd from *Kondylos*, which ſignifies a Joint; and was given it by Reſemblance, by reaſon that the little Tumours which compoſe the *Condylomæ*, are like the Tumours made by the *Joints*.

The *Condylomæ* is a *Tubercle* or Callous Eminence, which ariſes in the folds of the *Anus*, or rather a ſwelling and hardening of the wrinkles of that Part. Theſe Tumours frequently happen to the Orifices of the *Uterus*; they are caus'd by the Fluction of groſs and terreſtrious Humours to this Place, where we ſometimes find Inflammation and Pain, and always a hardneſs which muſt be ſoften'd by Emollient Medicines: We have ſeen it yield to theſe Remedies, and cur'd without being oblig'd to make uſe of Operation. But when general and particular Remedies prove unſucceſsful, we muſt have recourſe to the Hand.

We cannot exactly trace out the manner of operating, becauſe it depends on the Figure of the *Condylomæ*; if its Baſis is narrow, we are to tie it with a Linen Thread or Silk, and having well tited the Ligature at ſeveral times, wait its falling off of it ſelf: If the Baſis be too broad to ſuffer a Ligature, the Chirurgeon muſt cut if off with Sciſſars, holding it faſt with his Pincers, and ſo ſeparate it wholly at once. But if the Sciſſars are not proper, becauſe its ſhape is inconvenient, or 'tis too hard, he makes uſe of the Inciſion-Knife, with which he cuts it off very near its Root; and if a great quantity of Blood iſſues out, which moſt commonly happens, by reaſon of the number of Veins which bedew the *Anus*, we ſtop the Flux with aſtringent Powders, and

then dreſs the Wound with Mundicatives, to waſte and conſume its Roots, and procure a cicatriſing by Deſiccatives.

About the Fundament there ſometimes grow ſeveral Excreſcencies, which are call'd *Criſtæ* or *Combs*, by reaſon that they reſemble *Cock's Combs*; it very ſeldom happens, that we find one alone, there are generally ſeveral of them which border on the *Anus*. When theſe ſorts of *Criſtæ* are ſmall, and don't incommode the Patient, I ſhould adviſe the leaving them untouch'd; but when they grow too big and troubleſome, we muſt get rid of them, which is always by Operation; which is perform'd either by *Ligature*, *Cauteriſation*, or *Amputation*.

Of theſe three the laſt is the beſt, by reaſon 'tis more expeditious and certain: The Chirurgeon takes a pair of Sciſſars, and in the other hand holds one of the *Criſtæ*, which he cuts off cloſe to the *Anus*, thus cutting them all off one after another; and when he has ſuffered a little Porringer or two of Blood to run off, in order to diſcharge the Part, he ſprinkles on the Wounds aſtringent Powders to ſtop the Flux; and afterwards dreſſes all theſe ſmall Wounds with ſuch Ingredients as are proper to cicatriſe them with the greateſt Expedition.

Rhagades produce a ſort of *Sciſſures*, *Chaps*, or *Creviſſes*, which appear on the *Anus*. The word *Rhagade* comes from the *Greek* Verb *Rizein*, to cut, becauſe the *Anus* is all over Interſected by theſe ſorts of Clefts, which produce narrow long Ulcers, which very much incommode the Patient, eſpecially when the *Anus* is forced to open it ſelf to admit the Paſſage of the Excrements: The *Acrimony* of the Humours, and the hardneſs of the Excrements are the cauſes of theſe Indiſpoſitions, which, in their beginning, are cur'd by deſiccative Remedies, ſuch as the Vulnerary Water; but growing old and confirm'd, they become Hard and Callous, and then their Calloſity muſt be conſum'd, in order to give us hopes of a Cure.

There are two ways of removing this Calloſity, one is by Cauſtick, and the other by Cauteriſing. Some Practitioners make uſe of corroſive and mordicant Unguents, others prefer the Inciſion-Knife, with which they renew and refreſh theſe ſorts of Ulcers. As for me, I adviſe the uſe of both theſe Means; to begin with the Inciſion-Knife, wi which the Calloſities are to be cut in ſe ral Places, and then to proceed to the uſe leſs corroſive Unguents, than if we had firſt began with thoſe Remedies. By th means we compleat the Conſumption thoſe Hardneſſes with leſs Pain, drying t Part by little and little, and with prop Drugs we procure the cicatriſing of t Wounds, which we have made or renew

There happens beſides to the *Anus* a C *neous Excreſcence*, which is call'd *Ficus*, i a *Fig*; as alſo *Sarcoma*, and a *Fungus Muſhroom*: 'Tis beſides by the Vulgar term St. *Fiacre*'s Diſeaſe. This Carnoſity ri and grows as Muſhrooms do on Oaks, a comes in the Neck of the Matrix, and ſe ral other Parts of the Body; but thoſe of t *Anus* are more difficult to cure, by reaſon their Situation, the Humours flowing them in great Quantities, whence there iſſu out of it a very filthy ſtinking *Sanies*.

The Operation conſiſts in the Extirpati of the *Fungus*, which, in proceſs of Ti coming to grow, would more and more i commode the Patient. We prepare the B dy by general Remedies, as *Phlebotomy* a *Purgations*; then with the *Inciſion-Knife*, cut off the *Fungus* near its Root; after whi we apply to the Wound *Oil of Vitriol* te per'd, *Powder of Savin*, and other Remedi in order to conſume the remainder of Roots. If its Baſis is Small and Tend it muſt be bound with a *Thread*, whi muſt be guided by the *Forceps*, and dra thither every day 'till the *Fungus* falls off.

There is yet another ſort of *Malign Fungus*, rooted in the *Rectum*: There is Hoſpital maintain'd at *Rome* for the cure Patients afflicted with this Indiſpoſition. have ſeen the Dreſſing of theſe unhap Wretches, in which the Chirurgeons ſp neither Iron nor Fire, and the Cries utte by them do not move the Pity of their C rurgeons or Spectators, by reaſon the S is the conſequence of an infamous Conve with Men, as the Venereal Diſtempers of the careſſing of debauch'd Women, a becauſe theſe obſtinate Tumours are loo on as an Effect of the Divine Juſtice, wh puniſhes ſuch as commit thoſe Crimes. *France* being ſo happy, as not to have t Diſtempers known in its Territories, I ſh ſay nothing more of them.

According to *Fabricius*, the Etymology of *Hæmorrhoids* comes from the *Greek* Word *Hema*, which ſignifies *Blood*, and the Verb *Rheo* to *Flow*, to expreſs its being a Flux of Blood. *Thevenin* ſays, that they took their Name from a Serpent call'd *Hæmorrhois* or *Flux of Blood*, whoſe biting excited a Flux of Blood in ſeveral places of the Body of the bitten Patient. They have imparted their Name to the *Hæmorrhoidal Veins*, by reaſon this Diſtemper generally comes on the Extremity of the Veins of the Fundament.

The *Hæmorrhoids* are painful Tumours, reſembling *Varices*, full of groſs Blood, and proceeding from the Dilation of the Extremities of the Veins, ſurrounding the *Anus*. There are four ſorts of them which differ amongſt themſelves, with regard to the Matter of which they are compoſed. We call thoſe *Uval* which are full of pure and natural Blood, whoſe only Fault is exceſs in Quantity. We term thoſe *Morales*, which are produced from a Thick, Groſs, Black Blood: Thoſe are ſtil'd *verrucal*, which are hard and full of Aduſt and melancholy Blood; and *veſical*, thoſe which are form'd from a crude pituitous Humour. Theſe Names are given theſe ſeveral Species, on account of the Reſemblance which they bear to a Grape, a *Mulberry*, in *Latin*, *Morus*; a *Wart*, in *Latin Verruca*; and *Veſica*, a *Bladder*.

The Ancients ſet up ſeveral other different Species of *Hæmorrhoids*; they diſtinguiſhed between Internal and External, alledging the one to proceed from the *Vena Cava*, and the other from the *Vena Porta*, that the former voided pure, and the latter groſs Blood; that thoſe which proceed from the *Vena Cava*, purge the *Plethora*, and thoſe from the *Vena Porta* the *Cacochymia*. But the Circulation of the Blood informs us, that theſe Veins carry nothing to the *Anus*; and that on the contrary, they only return back into the *Vena Cava*, the Blood ſent thither by the Arteries. So that all theſe Veins are filled with the ſame Blood, which ſcarce being able to reaſcend, and ſtaying in theſe Veſſels, by ſlow degrees dilates them, and forms the Tumours which we call *Hæmorrhoids*.

Authors aſſign ſeveral Cauſes of the *Hæmorrhoids*, and ſeveral uſeleſs Arguments have been form'd; but without troubling ourſelves with what the Ancients have ſaid, we need not only examine the Mechanical Structure of the Part, in order to be inform'd truly how the Piles are produced.

In my Anatomy I have ſhewn, that the *Hæmorrhoidal Arteries* ſend out more branches to the *Rectum*, than are requiſite for its Nouriſhment, that a great Number of theſe ſmall Arteries terminate at the Glands with which they are interſperſt; that theſe Glands ſeparate and filter part of the Impurities of the Blood, which are diſpers'd by the Veſſels which perform the Excretion of theſe Filtrations into the *Rectum*, ſo that this multitude of Conduits is neceſſary to the Purification of the Blood. I add, that we pay very dear for this Service which the *Hemorrhoids* do us; and, indeed, the thinneſt Lympha ſeparating it ſelf from the Blood, when it paſſes from the *Hæmorrhoidal* Arteries in the Veins of the ſame Name, it ought to be thicker and heavier than when in the Veins, and conſequently cannot reaſcend without Difficulty; the rather, beſides that there being no Muſcles, nor any part which can aſſiſt its Advancement to the great Truncks, becauſe the *Rectum* is lodg'd in a bony Baſin, which will not allow any Compreſſion to favour its Courſe, as the Muſcles do that of the Blood which is obliged to reaſcend from the Extremities: This Humour cannot mount upwards, unleſs when the *Hæmorrhoidal* Veins being extreamly fill'd by the Arteries, which inceſſantly furniſh them, diſcharge themſelves into the *ſuperior Veins*, which empty themſelves with more eaſe. The Efforts made on any occaſion whatſoever, and particularly for the expulſion of the Excrements, contribute very much to the production of the *Hæmorrhoids*, becauſe that inſtead of helping on the return of the Blood, they force it towards the *Anus*, where being obliged to remain in the *Hæmorrhoidal Veins* as in a Sack, it conſtrains them to extend, and cauſe this cruel Diſeaſe, from which ſcarce any Perſon is Exempt.

The Piles are eaſily known, with a touch of the Finger, or a caſt of the Eye, we diſcover Tumours of a different Size. Some are as big as Haſle-nuts, and others as large as ſmall Eggs; their Colours alſo vary in proportion to the length of time which the Blood has continued there. Theſe which I am ſpeaking of, are the *external Hæmorrhoids*;

hoids; beſides which, I know no other; for as for thoſe ſtiled *Internal*, I never ſaw any of them, nor have I any Notion how they can poſſibly be form'd. I know only that ſeveral call other Indiſpoſitions which affect the *Rectum*, by the Name of *internal Hæmorrhoids*.

The cure of the *Hæmorrhoids* is very difficult, not to ſay impoſſible. Authors have propos'd two Methods, which are the Palliative and Eradicative: But I ſhould never adviſe the Chirurgeon to undertake any farther than the former, it not being in the power of Phyſick and Chirurgery to compaſs the latter.

Before the Chirurgeon ventures to undertake any thing, he muſt examine whether the *Hæmorrhoids* are *Obſcure* or *Fluid*. We call thoſe obſcure from whence no Blood iſſues, and thoſe fluid which void that Liquor from time to time. I ſay from time to time, becauſe they do not emit a great Quantity, unleſs when the Patient goes to Stool, and what comes out the reſt of the Day, amounts to no more than a draining, which only ſtains his Linen.

When the Piles iſſue forth only in a moderate Degree, the Patient is not to be touch'd, by reaſon 'twould be fully as prejudicial to a Man labouring under this light Indiſpoſition, to attempt to Cure him, as to a Woman to ſuppreſs her Courſes. Tis the Foundation of the Health of many Men, ſome of which have them as regularly as Women their Terms, and alſo find themſelves indiſpos'd when this Flux has been retarded ſome Months. But when 'tis exceſſive, when it weakens and emaciates the Patient, and turns his Complexion to a ſallow Tawny, endeavours are to be us'd to mitigate their Flux, but not to ſuppreſs them; and in this caſe we are oblig'd to the obſervance of a twofold *Regimen*, the one *Univerſal*, and the other *Particular*. By the former we underſtand the Courſe of Diet, which avoids all Edibles which produce too much Blood; Phlebotomy, which evacuates it; the Potions and Drinks which dilute and dulcifie the Acrimonious Humours, and the Patient's ſeduloufly avoiding all manner of Melancholy and Angry Tranſports; and laſtly, the uſe of Stypticks, and thoſe Medicaments which thicken the Blood, as Rice, Quinces, and ſubſtantial Wine alſo Chalybeat Waters. By the *Particular Regimen* we mean the Remedies apply'd to the Part, which are to be Aſtringent ſmall Bags fill'd with Sa[illegible], and Bran, with Oil of Roſes, Myrrh, *&c.*

Tho' the *ſurd Hæmorrhoids* are not F but attended with Inflammation and P we muſt begin with aſſwaging the la which is done by the Application of e lient Remedies, to this Part, of which are *Pulp* of *Caſſia*, *Pomatum* compos'd o *puleum*, and the Yelk of an Egg, Mil which has been boil'd in *Chervil*, *Plantane*, *white Mulleyn* or *Verbaſcum*, and ſeve ther Ingredients whoſe number is infi and of which there are as many ſorts a the Gout and Toothach. The Patient m alſo be blooded, to prevent the Blood pairing in any quantity to that Part.

When after the uſe of all theſe Reme the *Hæmorrhoids* don't diminiſh, but Pain and Tenſion Remain, or increaſe, muſt make uſe of means to empty thoſe mours; which are of two ſorts, either Application of Leeches, or Punction by Lancet. The uſe of Leeches is prefer as well becauſe the Patient is leſs afra them than the Lancet, as by reaſon make a ſmaller Orifice, which is e cured: A Leech is then to be apply each *Hæmorrhoid*, and left to draw till emptied, after which it is made to fal then the Chirurgeon makes uſe of a *ment* compos'd of Oil of Eggs, pow Ceruſe, and calcined Litharge, laying the *Hæmorrhoids* a Pledget throughly ſten'd in this *Liniment*, a Bolſter above and over both a Bandage, which a preſſing them, hinders their ſpeedy filli gain.

If the Leeches happen not to bite, o believe the Blood to be too thick t drawn by them, ſo that we are forc make uſe of the Lancet, the Orifices be made at the loweſt place to empty the more Commodiouſly, and the punc are not to be made larger than juſt wh neceſſary to give iſſue to the Blood; w done, the *Liniment* and *Apparatus* is app as above.

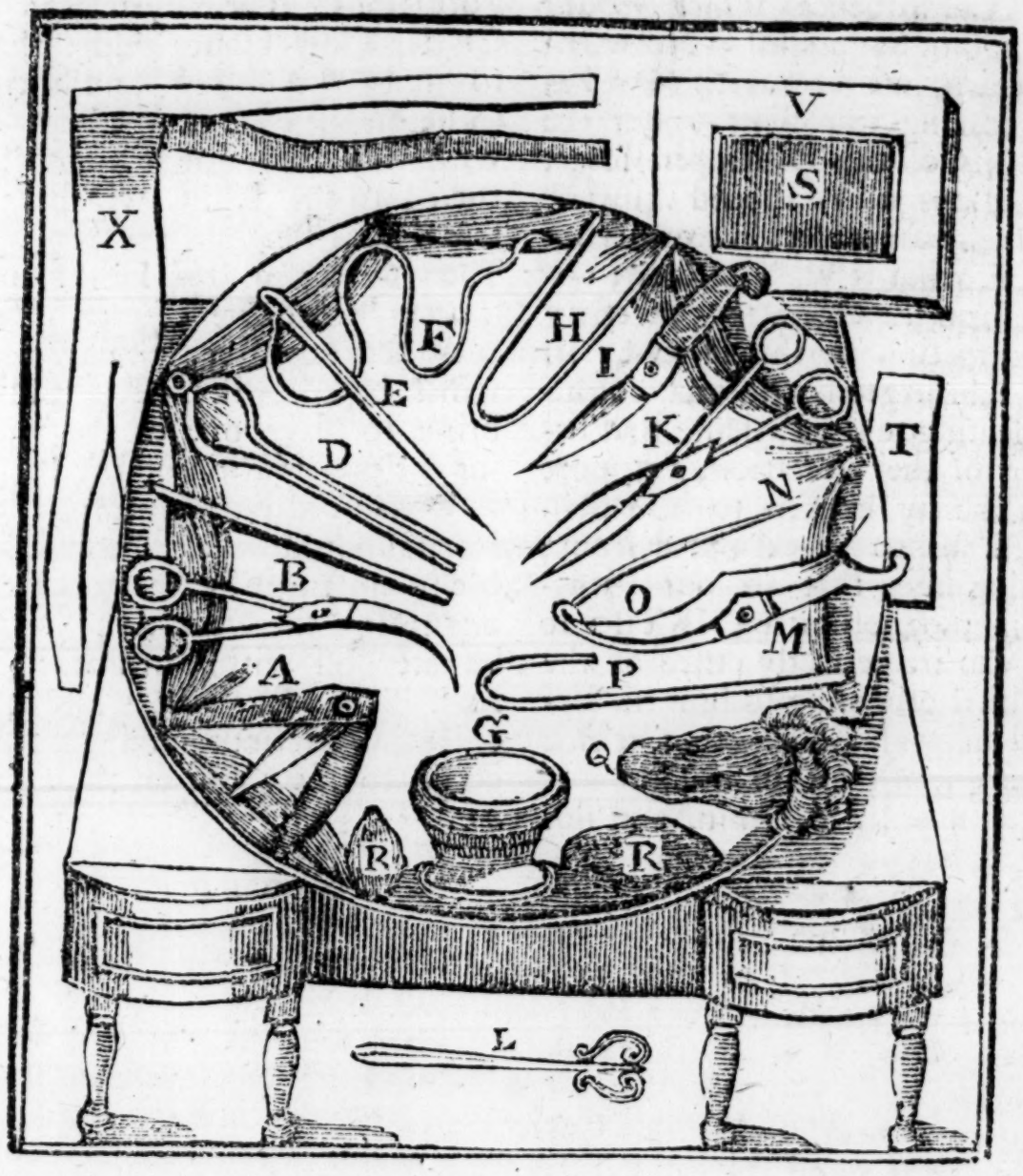
The Patient finds relief immediately the emptying the *Hæmorrhoids*, and the

tion of Pain and Tenſion afford him the reſhing guſt of a very agreeable Eaſe; but re yet remains a continual draining thro' Orifices which becomes very trouble-ne, though there is none but muſt own t 'tis preferable to the former Pains, and pernicious Conſequences which would end them, if not Suppreſſed. Notwith-nding all which, we meet with ſome Pa-nts who growing impatient under the enſive foulneſs of this Diſtemper, forget eſſential Reaſons which ſhould diſſwade m from deſiring an eradicative or perfect re; and coſt what it will, reſolve to o-ge us to perform the Operations neceſſary he utter extirpation of this Diſeaſe: In caſe the Chirurgeon is to excuſe him-, by repreſenting to the Patient, that be-s the Pains of the Operation, yet more ſiderable ills may happen to him than e he is deſirous to be exempted from; acquainting him, that all our Prede-rs agree in prognoſticating Diſeaſes to on thoſe who are perfectly cured of the s; and withal propoſing to him the Ex-ent agreed on by all Chirurgeons, which leave open one of theſe ſmall Tumours, der to retain a little Drain, and not to expoſe the Patient to all the Diſeaſes with which the moſt famous Chirurgeons menace them.

When the Patient is reſolutely determin'd, he is to be prepar'd by frequent Bleeding in proportion to his Strength, and by ſome Purgations. The Chirurgeon gives him a Clyſter a few Hours before the Operation, to empty the *Rectum*, and then obliges him to lie on the edge of the Bed, on his Belly, with his Feet down, and his Buttocks turn'd to the Light, which he cauſes to be ſeparated from one another by a Servant: Then taking in his Left Hand, with the Forceps, the Purſe of each *Hæmorrhoid*, he cuts them one after another with the Sciſſars, which he holds in his Right Hand, remembring to leave one of the leaſt remaining for the preſervation of the Patient's Health, as we have already hinted. If any of theſe Purſes ſhould be left, becauſe 'twas impoſſible to cut them by reaſon of the Blood interrupting the Operation, 'tis afterwards to be eaten off with Ointments proper to that End. The *Apparatus* is like that of the precedent Operations, and that which I am going to ſhew you on the *Fiſtula* in the *Anus*.

Of

Of the Fiſtula in Ano; *with a* Figure *for the Operation.*



A *Fiſtula* is called by the *Greeks Syrinx*, a *Flute*, derived from the Verb *ſirizein*, to *whiſtle*, and that *Metaphorically*, by reaſon this Diſtemper has a long ſtrait Cavity like that of Flutes. It is defined to be a deep and cavernous Ulcer, whoſe Entrance is narrow, and its Bottom broader, and from it iſſues a ſharp and virulent *Pus* or Matter, and is almoſt always attended with a Calloſity.

Fiſtula's come in ſeveral Parts of our Bodies, after Abſceſſes, and Wounds of the Breaſt, the Lower Belly and Joints; and more frequently in the *Anus* than any other Part. 'Tis the Operation performed on the laſt which I ſhall demonſtrate to you a ſent, referring you for the Cure of the o to that of *Fiſtula's* in general.

This Diſeaſe ſeems at preſent to be riſe than formerly: We every Day h Operations performed on ſuch Perſo did not before ſeem afflicted with it: Diſtemper grown in Faſhion ſince that the King had, and on which the C geons were forced to perform the Ope in order to its Cure. Several of thoſ before that Time carefully concealed having it, are not now aſhamed to p it; and ſome Courtiers have even *Verſailles* for the Place where the

ndergo this Operation, becauſe the King hould be informed of all the Circumſtances f their Indiſpoſition. Thoſe who have nly a ſmall Draining run immediately and urn up their Poſteriors to a Chirurgeon or him to make an Inciſion. I have ſeen bove thirty who deſired to have the Operaion performed, and whoſe Folly was ſo reat, that they ſeem'd angry when they were ſſured that they did not at all want it.

The *Fiſtula* in the *Anus* is always a Conſeuence of an Abſceſs in that Part. It beins with a ſmall Hardneſs, which quickly ncreaſes and ripens: 'Tis ordinarily taken or an *Hæmorrhois*, whence the ſhewing it o the Chirurgeon is often neglected. This Abſceſs breaking either in the Inteſtine, or n the Edge of the *Anus*, the Patient finds himſelf eas'd, and then believes himſelf cured without the Chirurgeon's Help, in which he is miſtaken; for the Matter having made but a ſmall Orifice to run out, remains in the Place where there is a Vacuity, and from thence continually iſſues out, but is never cured without opening the Sack or Purſe to cleanſe it, and procure the Return of good Fleſh to fill it up entirely.

When the Patient requires the Aſſiſtance of the Hand before the Abſceſs is broken, the Chirurgeon is not to ſtay till it breaks itſelf, becauſe the Matter will corrode the whole Circumference of the Part to make its Way; and the Inteſtine being more tender than the Skin, it will rather make an Orifice in that, than pierce the Skin, in order to iſſue out: And beſides, this Corruption continuing amongſt the fleſhy Parts, it ſeparates them; ſo that the Inteſtine being denudated, can never reunite with the neighbouring Fleſh without Operation. To prevent theſe Symptoms, we muſt then early open theſe Abſceſſes, and not wait for a great Fluctuation, as in other Abſceſſes; but they muſt be taken green, that is, before they are perfectly ripe. We muſt not make the Aperture with *Cauſticks*, for fear of loſing Time, and (by the Pain which they give) furniſhing an Opportunity to a greater Settlement of Humours in that Part, and to Mortification; for they gangrene in a very ſmall Time after. The Chirurgeon then firſt of all with the Lancet *A.* makes an Orifice to evacuate the Matter; then with the Sciſſars *B.* cuts the Side which has the moſt Room, ſufficiently to convey the Remedies to the Bottom of the Cavity, in order to cleanſe and heal it. But if on thruſting a Finger into the Wound which he ſhall have made, and another into the *Anus*, he finds the *Rectum* denudated or ſtrip'd, which he will diſcover by the Thickneſs which he feels betwixt his two Fingers, he muſt then cut that Inteſtine to the Extremity of the Abſceſs, in which he is to guide himſelf by inſinuating one of the Branches of the Sciſſars into the Wound, and the other into the *Anus*, in order to cut all that is betwixt them both: Alſo he muſt cut the Gut a little more forward than the Bottom of the Abſceſs, becauſe that he ought rather to riſque the making the Thickneſs of two Crowns larger than neceſſary, than the Thickneſs of one leſs. The Abſceſs thus well open'd, is to be dreſs'd, as we ſhall preſently ſhew in the Operation of the *Fiſtula*.

This is what is to be practiſed to avoid a *Fiſtula*; but when 'tis form'd, either by the Negligence of the Chirurgeon, in not ſufficiently opening it, or the Obſtinacy of the Patient, who would not before conſent to its being open'd, the Nature of the *Fiſtula* muſt be examined, before the Operation is concluded on.

There are laid down three Sorts of *Fiſtula's* in general: The firſt, when the Ulcer is open without, and not within; the ſecond, when it pierces the Inteſtine, without iſſuing outwards; and the third, when it communicates without and within. The firſt are apparent, and eaſily diſcover themſelves; and the Probe which is introduced, informs us whether they are ſuperficial or deep. We are aſcertain'd of the Exiſtence of the ſecond, when we find corrupt Matter iſſue out with the Excrements, and particularly when an Abſceſs has preceded; and by thruſting the Forefinger, we are ſatisfied whether the Orifice be diſtant from or near the *Anus*. The third are diſcovered by thruſting the Probe *C.* into the *Fiſtula*, and the Finger into the *Anus*; for if we feel the End of the Probe with our Finger, we may depend on it that the Gut is pierced: The ſmall *Dilator D.* introduced into the *Anus*, is very proper to ſearch it. We call theſe laſt *Fiſtula's* com-

pleat ones; and the firſt imperfect, becauſe they have but one Orifice.

Every one of theſe Species is alſo ſubdivided into ſeveral Sorts; ſome of which are near the *Anus*, others one or two Fingers Breadth diſtant from them: Some are at the Edge of the Inteſtine, and others deeper in. We find ſome with one Cavity, and many with ſeveral like a Gooſe's Foot; and theſe various Cavities are named *Coney-boroughs*: Some incline towards the *Rectum*, and ſome towards the Bladder, or the Hip-bone. To conclude, they are either recent, or old and callous.

The Chirurgeon is to prognoſticate according to the Nature of the *Fiſtula*, and without promiſing more than he can perform, to be always dubious; for what Appearance ſoever there may be of Succeſs, there frequently happen ſome Accidents which hinder the accompliſhing of what he has promiſed.

Three Ways of curing *Fiſtula's* are propoſed, *viz. Cauſticks*, *Ligature*, and *Inciſion*. After we ſhall have examined them all three, we will decide which is the beſt.

About thirty Years ſince, one *le Moyne* at *Paris* acquired a great Reputation for the Cure of *Fiſtula's*. His Method conſiſted in the Uſe of *Cauſticks*, that is to ſay, with a corroſive Unguent, with which he cover'd a ſmall Tent, which he thruſt into the Ulcer; by which he daily by little and little conſumed the Circumference, taking care to enlarge the Tent daily; ſo that by widening the *Fiſtula*, he diſcovered its Bottom. If he found there any Calloſity, he corroded it with his Ointment, which alſo ſerved to deſtroy the Coney-boroughs; and at laſt, with Patience, he cured many. This Man died old and rich, by reaſon he made his Patients pay very well for their Cure, in which he was in the right; for the Publick value Things no otherwiſe than in Proportion to the Sum which they coſt. Thoſe who were affrighted at the Thoughts of the Sciſſars threw themſelves into his Hands; and tho' the Number of raſcally Pretenders is very great, yet they never want Practice.

Thevenin prefers Ligature to the two other Ways of curing a *Fiſtula* in the *Anus*. He affirms, that he never knew it miſs of full Succeſs, and adviſes it to be thus performed: The Patient is to ſtand on his Feet with his Body bent, and reſting on the Edge of the Bed, he muſt firſt of all be ordered to open his Legs and Thighs, which the Chirurgeon muſt cauſe to be held firm by two Servants for fear he ſhould cloſe them again, and grow weary during the Time of Operation. The Patient thus diſpoſed, the Chirurgeon thruſts into the *Anus* the Forefinger of his left Hand, after having rubbed it with Oil of Sweet Almonds, or ſome other oleaginous Matter, to procure its more eaſy Entrance; then in his right Hand he takes the Probe *E.* made of ſoften'd Braſs or ſilver Wire, and threaded with the double brown Flax Thread *F.* or with an Hair out of a Horſe's Tail, in order to cut the more readily. He introduces this Probe into the Orifice of the *Fiſtula*, and meeting the End of it with his Finger already in the Inteſtine, he bends it back, and draws it out at the *Anus*, bringing with him one of the Ends of the Thread; which being come out, with that, and the other End which runs through the *Fiſtula*, he makes a Ligature with a ſlipping Knot, and daily draws it tighter, till it has cut through the Place which it contains. If the *Fiſtula* was imperfect, and the Inteſtine not yet pierced, he muſt not make any Difficulty of piercing it with the Extremity of the Probe, which is eaſily done, by reſting it on his Finger which is in the *Anus*, after which he bends the Probe, and ties the two Ends of the Thread as before directed.

The third Way is by *Inciſion*; which being the moſt univerſally practiſed and followed, I ſhall enlarge more on that than the others, to avoid the Omiſſion of any Circumſtance, and in order to inſtruct young Chirurgeons the more exactly. To this End then, 'tis firſt of all to be obſerved, that before the Operation the Time is to be choſen for in Summer or Winter, the Exceſs of Heat or Cold may oblige the Chirurgeon to ſtay till the Air grows moderate, and the Operation may be deferred without any Danger, whilſt the *Fiſtula* is recent. He muſt then prepare the Body by Bleedings and Purgations adapted to the Patient's Conſtitution; and having fix'd the Day and Hour he is to diſpoſe the *Apparatus*, ſuch as you ſee in the Cut.

Two

Two Hours before the Operation, a Clyſter is to be given, in order to empty the Inteſtine, for fear the Strains which it may excite may otherwiſe force the Excrements to fly into the Chirurgeon's Face, as it ſometimes happens; for which Reaſon alſo he ſhould not place himſelf directly behind the Patient, but a little on one Side, to avoid this Fuſee, which will prove very diſagreeable. The Patient is to be placed on the Edge of the Bed, with a Pillow under his Belly, in order to raiſe up his Buttocks, which muſt be turn'd to the Light, his Thighs open'd and held by two Servants, to prevent his ſtirring in the Time of the Operation.

Secondly, During the Operation, the Chirurgeon (as in the Ligature) muſt be provided with Oil *G.* with which he muſt rub the Forefinger of his left Hand, in order to introduce it into the *Anus* without Pain; and in his right Hand he takes the Stiletto *H.* which he introduces into the *Fiſtula* by its exterior Orifice, guiding it along till it comes out at the Hole in the Gut, which he will feel with his Finger which is in the *Anus*; then with the End of the ſame Finger he bends the Stiletto, and cauſes it to come out at the Fundament in ſuch Manner, that all that is to be cut is graſp'd betwixt its two Branches; then with the Inciſion-knife *I.* or the Sciſſars *K.* he cuts at once or twice the Fleſh contained betwixt the two Branches of the ſaid Stiletto, aſſuring himſelf that he has cut all that he ought, when that Inſtrument is entirely looſen'd and diſengaged. He then thruſts his Finger to the Bottom of the *Fiſtula*, which frequently is full of Cavities or Coney-boroughs, which as far as poſſible, he ought to open to their Bottoms; and if with the Finger he finds any Calloſities in the *Fiſtula*, with the ſame Inciſion-knife he makes ſeveral ſmall Inciſions on the harden'd Places, that the Remedies may eat and conſume them. Some, inſtead of the Stiletto, make uſe of the hollow Probe *L.* which they bend in the ſame Manner, and its Gutter helps them to guide the Point of the Sciſſars.

Thus all good Practitioners have hitherto performed this Operation; but it has of late Years been improved, and Ways have been diſcovered of performing it more expeditiouſly. There has lately been invented a curve Inciſion-knife *M.* at the End of which is faſten'd a Stiletto *N.* ſo that inſtead of two ſeparate Inſtruments, they make uſe of but one, which is both a Stiletto and Inciſion-knife together, which they uſe in the following Manner. By a ſmall Inciſion made with the common Inciſion-Knife, they enlarge the External Orifice of the Fiſtula, in order to introduce the more eaſily the Inciſion-Knife with the long Stiletto, which is Pointed, and of a ſoften'd Metal, that it may be bent without Pain; this Inciſion-Knife muſt be Curve, Thin, Narrow, having the Edge cover'd with the Chape *O.* of Paſteboard or Silver, that it may be thruſt into the Fiſtula without hurting the Patient; after which, purſuant to the old Way, the Chirurgeon muſt thruſt his Finger to the bottom to feel for Cavities or Calloſities, which are to be Remedied, as we have already told you.

Thus you have ſeen two ways of performing the Operation on the perfect Fiſtula; they are both of them equally good, becauſe they open the Fiſtula to the bottom, and differ no otherwiſe than with Regard to the Inſtruments which are uſed in them. Let's next ſee what is to be done to imperfect Fiſtulas.

I have already inform'd you that in the performance of the Operation with the Ligature, when the Inteſtine is not open, it muſt be pierc'd, to contain all the Fleſh which the Thread is to cut; and 'tis in this abſolutely neceſſary to pierce it with the Stiletto, without which the Operation will be Imperfect: But the Inteſtine is ſo tender that it makes but a very ſmall Reſiſtance: When the Stiletto has made a hole in the Inteſtine in the bottom of the Fiſtula, 'tis to be drawn out by the *Anus*, and continue the Operation in the manner which I have juſt ſhewn.

If the Fiſtula is open only in the Gut, and not outwards, the Operation is more difficult, for to perform it we are obliged to find a way to make an external Orifice: To this end the Chirurgeon examines whether there is not ſome ſmall Tumour around the *Anus*, which indicates that it is the external end of the Fiſtula, and if we don't find on the Skin any Alteration, or redneſs which marks the empty Place; by reaſon on

ony ſuch Appearances 'twill be proper to apen thoſe places to thruſt the Inſtrument thro' them, and continue the Operation as above. When nothing is to be ſeen without, which can diſcover to us where we ought to open it, we take the Stiletto *P.* which is folded double, and one of whoſe ends is longer than the other; holding it by the longeſt End, we then introduce it into the *Anus*, and at the Moment that we draw it back, guiding it with the Finger already engag'd in the Inteſtine, we endeavour to get the ſhorteſt end of the ſaid Stiletto into the Orifice of the Fiſtula, then drawing it to us, we feel without the end of the Stiletto, on which we open the Part, and with the Inſtrument which we ſlide into it finiſh the Operation.

Thirdly, After the Operation the Wound muſt be dreſs'd with a large Stopple *Q.* ſhap'd like a Tent, which is to be moiſten'd in a Liniment, compos'd of Oil and the Yelks of Eggs, and forc'd into the *Anus*, to widen the ſeparation of the Lips of the Wound, and afterwards lay on the Pledgets *R. R.* cover'd with the ſame Liniment: The Plaiſter *S.* the long Bolſter *T.* then the ſquare one *V.* muſt all be apply'd in their order, and faſten'd by the Bandage *X.* The Patient muſt be put to Bed, or left to compoſe himſelf to reſt 'till the Evening, when the Chirurgeon takes from him three ſmall Porrengers of Blood, to avoid a freſh ſettlement of Humours on the Part Affected.

Theſe ſorts of Wounds are very troubleſome to dreſs, by reaſon that the Part Affected is the Paſſage of the groſs Excrements, and that a Flux of the Belly ſupervening the Operation, obliges the frequent taking off the *Apparatus*, and Dreſſing. For which reaſon the Chirurgeon leaves an Apprentice to lie in the Patient's Chamber, in order to dreſs the Wound as often as the Patient goes to Stool: But the Operator muſt endeavour to regulate this Evacuation, ſo that it may not happen above once a day, and then he muſt ſend an Apprentice an Hour before to take off the *Apparatus*, that the Patient being ſeated on a Cloſe-ſtool, may continue ſome time there in order to obtain a good Stool: After the Patient has emptied his Inteſtines, the Wound is to be waſh'd with warm Wine before 'tis dreſs'd. The Chirurgeon always makes uſe of a Stopple c ver'd with a very ſtrong Digeſtive, to clean it from and prevent the growth of prou Fleſh, which frequently happens in th Parts; the ſame courſe is to be daily co tinu'd, carefully avoiding the leſſening the Stopple faſter than the bottom of the *ſtula* fills with Fleſh; next we dry up t Wound, and endeavour to bring it to cic triſe well.

'Tis not difficult to decide which of th three ways is to be prefer'd. The Cauſti cauſes a continual Pain for five or ſix Wee during which time we are oblig'd to ma uſe of it. The Ligature is long in cutti the Fleſh thro', and muſt without fail tighted every Day, which is not done wit out Pain. Inciſion indeed inflicts a mo poinant Pain, but of ſo ſhort a Duratio that it ought not to alarm a Perſon who willing to be cur'd without danger of a Relapſe; for it not only accompliſhes in Minute, what the two others don't perfo in leſs than a Month, but yet the Cure th way is certain, whereas 'tis but dubious the others.

Theſe Reaſons determin'd the King chuſe the Inciſion, after having examin'd other Methods propos'd to him for the Cu of the Fiſtula, of which I will relate the H ſtory in few Words.

In the Year 1686. there aroſe near t King's *Anus* a ſmall Tumour, inclining wards the *Perinæum*: It was neither inflam nor very Painful. It grew ſlowly, and ter ripening, broke of it ſelf, by reaſon t the King would not ſuffer Monſieur *Fel* his Principal Chirurgeon to open it, as propos'd. This ſmall Abſceſs was attend with the ordinary Conſequences of thoſe ſufficiently open'd, to admit the Applica on of Remedies to the bottom of the Ca ty; there was only a ſmall Orifice, th which the Matter ran, it continu'd to ſu purate, and at laſt became Fiſtulous.

The ſole way left of curing it was Man al Operation; but the Great cannot alwa be brought to yield to it. A thouſand P ſons propos'd Remedies which they preten ed to be Infallible, and ſome of them wh were concluded to be the beſt were try but none of them ſucceeded.

His Majeſty was told that the Waters of *Barege* were excellent in theſe Caſes, and was alſo reported that he would go to thoſe Waters; but before taking that Journey, he thought fit to try them on ſeveral Patients; four Perſons were found who were afflicted with the ſame Diſtemper, and ſent to *Barege* at the King's Expence, under the Direction of Mr. *Gervais*, Chirurgeon in Ordinary to his Majeſty: He made the neceſſary Injections of this Water into their Fiſtula's for a conſiderable time, and us'd the proper means for their Cure, and at laſt brought them all back, as far advanc'd towards that end as when they firſt went thither.

A Woman reported at Court, that going to the Waters of *Bourbon* in order to be cur'd of a partieular Diſtemper, ſhe was by the Heat of them cur'd of a Fiſtula, which ſhe had before ſhe went thither. One of the King's Chirurgeons was ſent to *Bourbon* with ſome other Patients, who return'd in the ſame Condition in which they went.

A *Jacobine Fryer* applying to Monſieur *Louvoy*, told him that he had a Water with which he cur'd all Fiſtula's; another boaſted of a never-failing Ointment, and yet others propos'd different Remedies, alledging Cures which they pretended to have done. That Miniſter determining to neglect no means in order to the procuring a Reſtauration of a Health ſo important as that of the King, caus'd ſeveral Chambers to be furniſh'd, in which he placed Perſons afflicted with Fiſtula's, and cauſed them to be treated purſuant to the ſeveral Methods of the boaſting Pretenders to cure them, in the Preſence of Monſieur *Fælix*. A Year was ſpent in theſe various Eſſays, and not one Patient cured.

Monſieur *Beſſiere*, who examined the Indiſpoſition, being ask'd his Thoughts by the King, freely anſwer'd his Majeſty, that all the Remedies in the World would prove Vain without Manual Operation. At laſt the King, to whom Monſieur *Louvoy* and Monſieur *Fælix* gave an Account of what had paſs'd, ſeeing no hopes of being cured after any otherwiſe than by Operation, on which Monſieur *Fælix* continually inſiſted, determined for it; but would not acquaint any Perſon with his Reſolution: He delay'd it till his Return from *Fountain Bleau*, and one Morning had it perform'd, when nothing of that nature was ſuſpected by the Courtiers; who going to attend the King's *Levee* were inform'd that he had undergone the Operation, and reſolutely ſuffer'd all the Inciſions which Monſieur *Fælix* thought proper to be perform'd.

This happen'd on the 21ſt of *November* 1687. Monſieur *Fælix* to whom the King had left the Liberty of appointing what Surgeon he pleas'd to aſſiſt him, choſe Monſieur *Beſſiere*, who was accordingly preſent at this Operation, where only were Monſ. *De Louvoy*, and the two Phyſicians, Dr. *D'aquin*, and Dr. *Fagon*. The cicatrizing was very well manag'd, and the King perfectly cured: His Majeſty alſo royally recompens'd all thoſe who render'd him Service whilſt under this Indiſpoſition: He gave Monſieur *Fælix* fifty thouſand Crowns, Monſieur *D'aquin* an hundred thouſand Livers, Monſieur *Fagon* twenty four thouſand Livers, Monſieur *Beſſiere* forty thouſand Livers, and to each of his Apothecaries, in Number Four, twelve thouſand Livers, and to one *Raye*, Monſieur *Fælix*'s Apprentice four hundred Piſtoles.

Of

Of the Diſeaſes and their Cures incident to Women & Children. From Michaelis, St. Hiliare, Har de Morbis Infantum, Mead de Imperio So & Lunæ, *&c.*

Of the Straitneſs or Largeneſs of the Pudenda. *Of the* Clitoris, Neck Labia *of the* Uterus, *with the Puſtles and Scabs of the Privities; toget with the Condylomes in the Neck of the* Womb, &c.

THE ſtraitneſs of the *Pudenda*, if from the firſt Original and Conformation of the Parts is ſcarcely to be Remedied by Art, but if dilated from Coition it admits of a Cure: The firſt may ariſe from an Ulcer, or the unadviſed uſe of Aſtringents; the latter, from too frequent Coition that enlarges the Orifice, from whence may come Barrenneſs, and a falling down of the Womb, which is to be remedied by Manual Operation. But 'tis Fomentatious, *&c.* The Relaxation is aſſiſted by the uſe of Aſtringent Decoctions, and the like; with Alum, Comfry, Burdock Roots, and Galls, as for Example. Take *Comfry*, *Bole-Armenick*, *Dragon's Blood*, *Balauſtians*, *Alum*, *and Maſtick*, of each half an Ounce, in Powder, and make them into a *Peſſary*: Or, Take *Plantane* and *Oak-Leaves* of each half a Handful, *Bindweed Roots* one Ounce, *Pomegranate Peels*, *Balauſtians* and *Sumach* of each half an Ounce, *Alum* one Ounce, Boil 'em in Water, and foment the Parts therewith; ſome put up a piece of *Crude Alum* up the *Pudenda*.

In the cure of a Relaxed *Clitoris*, it is the beſt way not to proceed to Amputation at firſt, but rather wait for a Cure by trying Medicines; and therefore gentle Bleeding and Purging, with a ſlender Diet, is to be Preſcribed, and Diſcuſſing Things, as Olive and Lentisk Leaves, with *Mynſicht's Tinctura Caſtitatis*; and if theſe ſucceed not, Mild Catharticks and Cauſticks are to applyed, eſpecially ſuch as do not put Patient to a great deal of Pain; as Bu Alum, or Ointment of Ægyptiacum, Oi Roſe and Wax, made into a Linime Likewiſe a *Lixivium*, of which a *Sapo* m be made with Roman Vitriol, and a li *Opium* form'd into *Troches*, and the Fl ſprinkled with the Powder: If none theſe ſucceed, the Part muſt be cut off, w a Ligature of wax'd Silk, or a Horſe-h tied about the Root, and left there till *Clitoris* fall off: Sometimes other Carn Excreſcences grow in thoſe Parts, to him the Admiſſion of the *Penis*, but of thoſe have ſpoke in another Place. There three ſorts of Obſtructions of the Paſſage to the Womb, the firſt is in the Orifice, ſecond in the Neck, and the third in *Vagina*; if an intire Membrane obſtructs outward Orifice, there remains nothi but Section, and likewiſe where the Ul cloſes the Lips; but if the ſame lies deep the cure is difficult and not without Dange If it ariſes from a hard Tumour, it is lieved by Emollients; if from Fleſh p ceeding from the Ulcer, and the whole P ſage is not ſtop'd up, you need not cut, fore Evacuation, with drying and diſcuti Medicines, be attempted, eſpecially ſuch leſſen the Carnous Subſtance; as Franki cence, Birth Root, Myrrh, Aloes, Maſtic

such as eat it off, as Burnt *Alum*, *Ægyp-*
cum, &c.

In *Puſtules* and *Scabs* on the *Privities*, ſuch the Effect of good Diet, it will reſtore e Temperament of the Body, by correct-g the Humours that ariſe from a vitiated liment, eſpecially by avoiding the Acid, d Acid Salts. Afterward it is neceſſary to rrect and purifie the Blood by proper Eva-ations and Uterine Specificks, as thus; ake Jalap ℈j. Scammony, Sulphurate 4 rains; the *Fæcula Brionice* 5 Grains, Oil Saſſafras 2 Drops for a Doſe. Or, Take umitory Pills ℈j. Reſin of Jalap 6 Grains, agiſtery of the Peruvian Gum 4 Grains, ith *Crollius*'s Elixir or Eſſence of Mugwort, ake Pills. Or, Take Fumitory, Balm, enny-royal, of each a Handful, Roots of riony, Spurge, Black Hellebore, of each epared one Ounce. Jalap 6 Drams, Caſ-Lignea one and half; Salt of Tartar half Ounce. Infuſe theſe in a Bag for a *Diet rink* in two Gallons of Lime-Water, where-drink half a Pint every Morning. But as it is common theſe diſorders proceed om a Venereal Cauſe, then you muſt ap-opriate your Catharticks to the preſent aſe, and add to the Forms before pre-ribed 20 or 30 Grains of *Mercurius Dulcis* ell prepared; or give a Bolus over Night *Æthiops Mineral* half a Dram, with a ttle Syrup of Mugwort, and purge it off e next Day with the Diet-Drink.

The *Condylomes* or Knots in the Neck of e Womb, if attended with an Inflamma-on are Hard, otherwiſe Soft; the Cauſe muſt own to be an Acrid Malignant umour, which is not void of a pernicious enom or Poiſon; in the *Venereal* Caſes y are both in the *Pudenda* and *Podex*, their cure firſt conſidering Univerſal Purga-tives, conſiſts in proper Topicks. If the *Con-dylome* is Hard, and of long-ſtanding, it muſt be ſoftned by Cataplaſms, frequently apply'd, afterwards digeſted and dry'd up. Therefore the firſt thing ought to be a Fo-mentation, with the Emollients, eſpecially of Mullein, and for your Driers uſe the Teſtaceous Powders: For Pain and Inflam-mation apply Oil of Henbane, Mullein, and ſome few Grains of Opium, and if no-thing of this kind relieve, you muſt proceed to Section and Cauſticks.

The *Wheals*, *Warts*, or *Puſhes*, upon the *Privities*, ariſe from a groſs fæculent, and ſometimes a malignant Humour, that hath its Original Cauſe ſeated in the Skin, and therefore is moſt properly removed upon the Part, or by external Means, as dry'd Sage, Origanum, Rue, Savine, Frankincence, *&c.* then we may proceed to eroding Medicines, as the Juice of the Wild Cucumber, unripe Sloes, or the Juice of *Acacia*, Sheep's Dung, or Goat's Gall, with Salt, or Nitre; or if you would uſe Stronger, take Aqua Fortis uſed by the Gold Smiths, Spirit of Vitriol, or Sulphur, Butter of Antimony, and de-fend the neighbouring Parts from being in-jured by Bole Armeniack, Terra Lemnia made into a Paſte with Roſe Water; if theſe ſucceed not, you muſt draw the Warts out with Pinſers, and afterwards ſtop the Blood with ſuch Powders as will cure the Wound, and make a Cicatrice: But if their Roots are Deep, tie a Horſe-hair about each Wart, and ſo bind it Straiter every day till they drop off; if all theſe fail, you muſt uſe the Actual Cautery, and burn them off, apply-ing at the ſame time proper Defenſatives to the Parts.

---

of the Hæmorrhoids, Ulcers, Rhagades, Fiſtula, Cancer, *and* Gangrene *of the* Womb.

THERE are little ſwelling Knots or Puſtules ariſing from a Fæculent Con-x of Blood, out of the time of the Men-ual Purgations, that are ſometimes what call the blind *Piles*, and ſometimes the ody *Piles*, ſometimes with, and ſome-times without Pain. They are known both by Feeling and Seeing, and are often attend-ed with Pain, and an inordinate Flux of Blood: They make the Woman look Pale, and complain of Wearineſs. Having Re-gard to the right Government of Diet, and

if

if need be to Purgation and Bleeding, in order to Revulſe, we ſhall come to the preſent Relief, when the Piles are Painful and Troubleſome, Take Oil of Water Lillies, and Camomil, of each an Ounce, Juice of Bettune two Ounces, Barley Flower one Ounce, boil them, and then add Saffron a Dram, and the Yelks of 3 Eggs, make this into a Pultiſe, and apply to the Fundament. To anoint the Part, uſe Oil of Mullein, and Linſeed, Ointment of Poplar, and other cooling Ointments, but the moſt Efficacious both for the blind and bleeding Piles, is to touch them with Balſam of Sulphur, made with Oil of Turpentine, applyed hot to allay the Pain of the blind Piles, and dry up the Humour; uſe Bole Lemnian Earth, Acacia, Ceruſs Litharge, burnt Lead, *&c.* but where the Part is ſwell'd or tumefied with much Blood, Emollient and diſcutient Remedies are to be apply'd, to wit, the Fumes or Fomentations of Marſh-mallows, Pellitory of the Wall, Dwarf-Elder, Camomil Flowers, Mullen, Melilot, Linſeed, Fenugreek, *&c.* If theſe do not avail, the Knots are to be rub'd with Fig Leaves, Pellitory of the Wall, or live Swallows apply'd. If they flow moderately, Nature ought to be left to do her own Buſineſs; but in too great a Flux, Revulſion muſt be made by bleeding in the Arm, or applying Cupping-glaſſes, to the Superior Parts: Give likewiſe Tincture of Sulphur, or Vitriol, and the Crocus Martis Aſtringens in proper Vehicles.

Ulcers are often in the Womb it ſelf, as well as the Neck thereof; and are produced from foul Humours, the Venereal Diſeaſe, purging or corroding Medicines, difficult Labours, *&c.* The Signs are, firſt Pain, and a perpetual grinding or gnawing; ſecondly, they are viſible ſometimes to the naked Eye; in the place there flows a *Pus* of different Smells and Colours; if the Ulcer is ſeated towards the Orifice of the Bladder, there is a burning Heat and Inclination to Urine, the Head Aches, and eſpecially the Forepart. The difference of the Ulcers are known from the Purity or Foulneſs of the Matter flowing from them. The Pain is to be abated by Anodynes, with Steel infuſed in Milk, and the Whites of 3 or 4 Eggs, with Mucilage of Quince Seeds, Emulſions of Poppy Seeds; Mix'd with four greater cold Seeds, and Goats Milk the Pain is ſtill greater, Take Barley Wa to which add the Juice of Henbane, or pium, according to the greatneſs of Symptoms: The *Ulcer* ſometimes ſubmit gentle Means, as a Decoction of red Ro or Plantane: Where the Ulcer is Foul muſt deterge with Orrice Roots, and Ho firſt waſhing the Parts with a Decoctio Mallows; likewiſe theſe things are ſerv able, as Gum Ivy, Juniper, Maſtich, My Cadanum; but if the Ulcer proceed fro Venereal Cauſe, add a little Cinnabar the Ulcer is Corroding, and Spreads, w it with the Vitriolick and Aluminous ters, or the Phagedenick Water; Mix'd w that of Plantane, and a little Bole. W the *Ulcer* is cleans'd, it muſt be incarn and clos'd by a Cicatine, *Sulphureous* both Natural and Artificial are proper to Internals, Rhubarb, and the leſſer C taury may be given to drink, accordin *Dioſcorides*; in the Putrefaction of the A birth, the *Elixir Proprietatis* of *Paracel* Profitable; likewiſe Turpentine made with Sugar is ſerviceable in Eroſions Pains of the Womb, eſpecially if uſed a Scruple, or half a Dram of Pills of *lium.* If the Body begins to Emaciate, there be any ſuſpicion of a Hectick F give Aſſes Milk, with Conſerve of Ro

The *Rhagades* or Chaps, and Wrinkl the Neck of the Womb, are long ſinal cers, like thoſe that happen to the Hands, or Feet, in Winter Weather; ſo times they are Superficial, at other t Deep and Callous; they proceed either hard Labour, or a Flux of Acrid Hum and are often the Conſequences of In mation and *Condylomes*; if Recent, this affection is eaſy to remove; if of long tinuance, and the Ulcers are Callous, are difficult of Cure. If from a hard bour theſe Fiſſures happen, we muſt u jections of Roſes, Birth-wort, Plantane, Dragon's Blood, and Frankincenſe, in Spring Water, or Peſſaries made th with the White of an Egg. The Flu Acrid Humours requires univerſal Ev tion, and the Condylomes, peculiar picks, as before hinted; a Callous F muſt be anointed with Oil of white

Deer's Suet, Turpentine, and Wax, made into a Liniment if there be an Inflammation, or great itching joyn'd to the Former; Take Ointment of *Diapomphologies*, *Populeon*, of each an Ounce, Sugar of Lead and Camphore, of each a Scruple, Mix. Their Diet muſt be of moiſt Meats, and good Nutriment, abſtaining from Acrid, Sour and Salt Things; likewiſe from too much Motion and Venery.

Theſe Ulcers being neglected frequently degenerate into *Fiſtula's*, by reaſon of the Softneſs and Moiſture of the Parts, from whence they become difficult of Cure. The Cauſe proceeds from the *Pus* that corrodes the Fleſh, and carries on a Canal along the Veſſels, ſometimes to the very Neck of the *Bladder* or *Ulcers*, and ſometimes to the *Anus*, ſo that the Excrements ſhall proceed thence: Having firſt a regard to Purgatives, and a due Regimen for Living, we muſt next make uſe of Sudorificks, and apply deterging and ſtrengthening Injections, and ſometimes a Plaiſter of *Diachylon Simplex*; and where the Cure is not deſpair'd of, drying Vulnerary Drinks are to be Exhibited; then proper Topicks, as Roots of Gentian to dilate the Orifice, and Emollients to ſoften the Callous, all which if reſiſted, recourſe muſt be had to Manual Operation by Burning, Section, *&c.*

A *Cancer* of the *Womb* rarely attacks the Subſtance, but frequently ſeizes on the Neck of the *Uterus*, ſometimes with, and ſometimes without any *Ulcer*, it ariſes from the Acrimony of the Menſtrual Blood, and now and then from the *Venereal Virus*, which procures a *Scirrhus* Tumour, this produces the *Cancer*, and if the Corruption be great, an exulcerated *Cancer*; it is known from a painful Tumour, and pricking upon the Part, with Hardneſs, with a livid reddiſh Colour, which is more grievous according as it is ulcerated. This is often incurable, as well from the Matter as the Part Affected, eſpecially if the *Cancer* is Ulcerous: However, where hopes are left, moderate Aſtringents and Coolers are of Service; as Juice of Night-ſhade depurated, ſix Ounces, Tutty prepared, burnt Lead, of each two Drams, Camphire half a Dram, beat in a Leaden Mortar, to the Conſiſtence of an Unguent.

This Diſeaſe frequently turns to a *Gangrene*, either from the great Inflammation or *Ulcers* upon the Parts, or ſometimes it comes from a Deſcent of the Womb, and is known from the unuſual Heat there, as well as from the Fever and Trembling throughout the Body, after which the Colour of the Part is chang'd, and turns Livid; it is Soft and Dead, neither is there any Senſe or Pulſe remaining; ſo that you may cut without Feeling, and there is a great Stench: There likewiſe is a dejection of Spirits, the Heart is Heavy, and other diſmal Symptoms appear in the upper Parts of the Body. This great Diſaſter has ſtill greater Danger in delay, eſpecially if there appears Corruption, or the Parts are Rotten towards the *Uterus*, then it is Mortal; but if otherwiſe, proceed to remove the corrupted Parts, and put a ſtop to the farther ſpreading thereof, by ſcarifying the Part, and waſhing with a Decoction of Wormwood and Myrrh, in Spirit of Wine; likewiſe clap on a Plaiſter, or the Ointment of *Ægyptiacum*, or a Pultiſe made of Barley and Bean-flower, with Fænugreek-Seeds, and Oxymel of Squils, to which if neceſſary you may add Aloes, Myrrh, Balſam of Sulphur, and Sugar of Lead; fortifie the Internal Parts with good Cordials of Bezoar, Contrayerva, Goa-ſtone, or the like.

Of the Inflation, Inflammation, Scirrhus, *and* Dropſie *of the* Womb, *with the* Deſcent, Weakneſs, *and* Pain *thereof.*

THE Cauſe of this Inflation is a Windy, Watry, Groſs, Pituitous Matter, contained in the Veins of the Womb, and there either generated or tranſmitted therein. The Signs are the appearance of a Tumour in the *Abdomen*, and Region of the *Uterus*, oftentimes extending it ſelf to the Navel and *Diaphragm*, but never as the *Dropſie* coming to a great Bulk, neither does it provoke Thirſt. This Tumour ſometimes decreaſes by turns, and there are not thoſe ſharp Pains attending it, as are in the Inflammation of the Inteſtines. Women eaſily procure Inflations, if from the time of Delivery, or in their Monthly Courſes they expoſe themſelves to the cold Air, which readily inſinuates it ſelf into, and dilates the Womb. In this Caſe Purgatives are Convenient, as Pills of *Hiera cum Agaric*, the Catholick purging Powder, with ſome Grains of Caſtor, Carminatives, Extract of Caſtor, and Medicinal Wines, with Hyſtericks. But *Zacutus Luſitanus* adviſes to abſtain from all kinds of Phyſick, and leave Nature to her ſelf: Others propoſe an Inſtrument for the Eduction of Wind out of the *Uterus*, and which likewiſe in the Dropſie, and other diſorders of the Womb brings forth Matter thence; and this is prepared from *Guajacum*, externally the Chimical Oil of Camomil, Rue, Bay, Cummin, Carui and Fennil are good, ſo are Bags of the Carminative and Hyſterick Herbs.

But ſince the Inflation of the Womb ſeldom happens without Serum or Water; therefore Hydragogue Medicines are to be mix'd with Catharticks after this Manner. Take Pills of *Hiera cum Agarico* ℈j. Reſin of Jalap, Scammony ſulpherated, of each 5 gr. Etract of Elaterium 2 gr. with the ſame quantity of Caſtor: Make Pills thereof for a Doſe. Or, Take the Phlegmagogue and Hydragogue Extracts, Scammony ſulphurated, of each 6 gr. Mag. Gum, Peruv. 3 gr. Extract of Caſtor, Chym. Oil of Bayberries, of each 2 gr. or the Catholick purging Powder ℈j. *Tartar. Vitriolat.* 6 gr. *Fœcula Brionæ* 4 gr. Mix for a Doſe of Powders.

Take Pennyroyal, Camomil-flowers, of each a Handful, Roots of Briony, Lovage of each an Ounce, white *Machoacam*, *Eſula* prepared, of each half an Ounce, Orange Peels ʒ Drams, Aniſeed and Fennel, of each ʒiſs. True *Caſſia Lignea* ʒij. *Fœcula* of Briony ʒj. reduce theſe to Powder, and give half a Dram every other Day, letting the Patient drink after it the following Draught: Take Balm, Pennyroyal and Camomil Water, of each ʒij. Briony Water, Compound and Syrup of Orange Peels, of each ʒſs. Apply a Plaiſter of Bay-berries, Cummin and Carui, of each ten Drops, with a due quantity of white Bee's Wax.

The immediate Cauſe of the Inflammation of the *Uterus* proceeds from the Flux of the Blood being pure or impure: The Signs thereof are the Actions and Parts of the Womb, ſince they are affected from their Conſent therewith: Here appears a Tumour about the Region of the *Uterus*, with Heat, Diſtenſion, and Weight upon the Part; likewiſe the Fever is evident with the Dryneſs and Inflammation of the Tongue: If there be a Flux of pure Blood, all the Symptoms are Milder, but if biliary they are very Violent: This Diſorder is dangerous and eaſily turns into a Gangrene. The Remedies profitable in this Caſe, are of Mother of Time and Henbane, which abate the Pains, but by allaying of the Symptoms the Diſeaſe is not removed, therefore we muſt have recourſe to Alteratives: As the Alterative Decoction with Water of the Water-lilly, Houſeleek, Lettice, Syrup of *Nymphæ*, *Species Diatrion*, *Santalon*. The *Antihecticum*, *Poterii*, and *Cryſtals* Mineral of Lead: Externally a Cerecloth of Sander, Roſes, and Sugar of Lead is Convenient.

Take the Alterative Decoction, Syrup of Nymphæ, of each ʒij. The Philoſophical Spirit of Vitriol 6 Drops, for an *Hauſt*

or an Emulſion made of Houſeleek Water, and the 4 great cold Seeds, to which add the *Antihecticum Poterii* a Dram, and ſweeten with Syrup of Water-lillies. Or, Take Tincture of Roſes and Vitriolick Spirit of Venus, and outwardly apply Oil of Roſes and Henbane, and drink a Decoction of Lettuce and Navel-wort a Handful, Water-lilly Flowers ʒiij. boiled in Milk, to which may be added half an Handful of Henbane, which is very powerful both to abate the Pain, and allay the Inflammation.

In a *Scirrhus* of the Womb it is proper to expel the groſs fæculent Humours, by internal aperitive Specificks, eſpecially thoſe from black *Hellebore* and *Sal Armoniack*, and externally Plaiſter, and Ointment of Hemlock. Take Pills of Gum Ammoniack ℈j. Extract of black Hellebore, Reſin of Jalap, and *Sal Armoniack*, of each 6 gr. make into Pills, with the *Fæcula Brioniæ*. Take Balm a Handful, Flowers of Motherwort, and tops of Mugwort, of each 3, Roots of Briony, black Hellebore, of each one Ounce, Polipody ʒiſs. Leaves of *Sena* ʒvi. Roots of Jalap ʒſs. *Caſſia Lignea* ʒii. Salt of Tartar ʒſs. put them into a Bag for a Diet-Drink, in Water or New Ale, unhopp'd. Take *Fabricius Hildanus*'s Plaiſter of Hemlock, Malax it with Oil of Henbane, and apply to the Womb, or uſe a Liniment made of Ointment of Hemlock, and Oil of Henbane.

In relation to the Dropſie of the Womb there is a remarkable Hiſtory of a Woman of *Strasburgh*, who carry'd a ſwell'd diſtended Belly above ten Years, and at laſt was afflicted with a *Dropſie*, and 70 Moles in the Womb. Corroborating Hydragogues are ſerviceable to ſtrengthen the Womb; as the Eſſence and Extract of *Elatenum*, *Gum Galbanum*, *Ammoniacum*, and *Mynſicht*'s Hydragogue Extract and Syrup. *Rhumelius*'s Inſtrument mentioned before is of uſe to carry off the Water from the Womb: For your Catharticks take the following Forms. Take Extract of *Elaterium* 10 gr. Reſin of Jalap 6 gr. *Gutta Gamboge* 3 gr. Ballam of Peru *qſ.* make into Pills. Or, Take Extract of the Roots of Spurge 12 gr. *Gutta Gamboge* 5 gr. *Galban. Colatur qſ.* make into Pills. Or if you would purge by Urine, take Salt of Tartar ʒj. Salt of Broom and Scurvy-graſs, of each two Drams; *Tartar Vitriolat.* ʒj. *Sal Armoniack* ℈j. Crab's Eyes ʒſs. Mix all for Powders, whereof give a Dram twice a Day, drinking after each Doſe one Ounce of Juice of Briony in a Glaſs of white Wine: Externally may be apply'd a Cataplaſm of Goat's Dung, with Oil of Elder.

In the *Prolapſus Uteri* or Deſcent of the Womb, all emollient and lubricating Medicines are uſeful; but above all things, the fumigation of a ſalted Snake's Skin is to be prefer'd: Aſtringents are to be apply'd laſt of all, when the Womb is reſtored to its proper Place; for this purpoſe a Decoction of Alum, and that of unripe Sloes and *Acacia* are uſed to fume withal. Externally the Ointment call'd the Countes, the Styptick Plaiſter of *Crollius*, and a fumigation of Cow's Dung: Before replacing of the Womb the Bowels are to be looſn'd, afterwards aſtringent Baths are of Service. But ſince Wind is often troubleſome, and the Body is Bound, this or the like Clyſter may be given. Take of the Herbs for a common Emollient Carminative Decoction two Handfuls, Bayleaves half a Handful, Cummin Seeds half an Ounce, boil in Water, and in 6 or 8 Ounces of ſtrained Liquor, diſſolve an Ounce of Lenitive Electuary, and that of Bayberries ʒſs. and one Yelk of an Egg. Take Plantane, Rupture-wort, Comfry, Biſtort, Tormentil, of each a Handful, Alum one Ounce, put them in a Bag, boil 'em in Water, and apply them hot to the Womb. Likewiſe you may apply to the Part Plaiſter *ad Herniam*, or againſt Ruptures one Ounce and half *Croc. Martis Aſtringens* ʒij. Bear's Greaſe *qſ.* make a Plaiſter. Or, Take the Counteſs's Ointment ʒvi. *Croc. Martis* Aſtr. ʒij. Oil of Maſtick *qſ.* for a Liniment; ſo the Magnetick Ointment hath been much uſed by many eminent Authors.

For *Weakneſs of the Womb.* Take Nutmegs in Powder, Mother of Pearl, of each ʒſs. Mace, Saffron, of each ℈j. Bezoar ℈ſs. make them into Powder, whereof take a Scruple in Balm Water ʒiſs. *Aq. Mirabilis*, and Juice of *Kermes*, of each half an Ounce, Take Conſerve of Balm, Roſemary, and Sage-flowers, of each one Ounce, Nutmegs in Powder ʒij. Mother of Pearl four Scruples, Ivory without burning ʒiſs. Spirit of Balm ʒj. Syrup of *Kermes qſ.* Make an Electuary,

to be taken the ſize of a Nutmeg twice a Day, drink after it two or three Spoonfuls of the following mixture. Take of white Briony Water, Mugwort, Sage, Balm, of each ℥j. Mother of Pearl, ℈iß. Coral, Red and White ℈i. ſweeten with *Manus Chriſti* pearl'd.

In *Pain of the Uterus*, if it is grievous, and Anodynes do not anſwer, you proceed to Narcoticks, not neglecting neceſſary Evacuation, ſuch as is uſed in Hyſterick and Cholick Pains, after which Fomentations and Inunctions are of greater uſe, eſpecially thoſe of the emollient Kind, as Roots of Mallows, *Althea*, white Lilies, *&c.* Take white Agarick one Dram and a half, *Mechoacum* two Drams, Roots of Briony one Dram and a half; Infuſe in Balm Water and White-wine four Ounces all Night, then add Syrup of Balm three Drams, of Cinamon two Drams, for a purging Potio Or, Take Pills of *Hiera cum Agarico* o Scruple, Reſin of Jalap 6 gr. Scammony ſu phurated 4 gr. make into Pills, with the terine Elixir of *Crollius*: Or, Take the C tholick purging Powder a Scruple, *Fecu* of Briony 12 gr. Oil of Cloves one Dr mix for a Powder. Take Mugwort, Cam mil Flowers, of each a Handful, *Lova* Roots half an Ounce, Bayberries o Ounce; make into a Powder, whereof gi a Dram, after which drink this *Hauſt* Take Briony Water compound ſix Dra extract of *Opium* 1 gr. Magiſtery of Pe 6 gr. Syrup of Cinamon two Drams, mi for a Draught, or for a *Bole* give Conſer of Balm or Roſemary Flowers one Dra *Laud. Opiatum* 1 gr. or two, give at Be time.

Of the Suppreſſion or Stoppage of the Terms, *diſcolouring with the inordin or too great Flux thereof.*

THE Cure of this Diſeaſe conſiſts in Bleeeding after 3 or 4 Days Purging, and that a little before the accuſtom'd time of Evacuation: And as to Bleeding we ought to have regard to Cupping, eſpecially in the remote Parts firſt, and then in the Hips and Thighs: And during this whole time of Purgation to obſerve Ligatures and Friction, or Rubbing: As to Internals we muſt principally take care of the Tone of the Stomach and Inteſtines, by which means we muſt come to correct the Blood by the Aromaticks and Volatile Salts, to let us add Specificks to excite the Menſtrual Fermentation: Take your Emeticks from Antimony, which is admirable good in the beginning of the Suppreſſion to diſcharge the Morbifick Matter of the Stoma h.

The following Digeſtive Powder may precede Purgation. Take of the *Arcanum duplicatum* half a Dram, *Crocus Martis Aperitivus* two Scruples, Salt of Tartar half a Scruple, and make a Powder for three Doſes. A Phyſical Wine may be prepared with cool Herbs, as thoſe of Scur graſs, Water-creſſes, Celendine, Fumito Centaury, of each one Pugil, Raiſins Ounce, Saffron and Cinamon, of each Dram. For Catharticks take of the Fa Pill one Dram, *Gum Ammoniac* diſſol in Vinegar of *Squills* half a Dram, Extr of *Troches* of *Alhandal* 3 Grains, wit ſufficient quantity of Oil of Amber m into Pills. Or, Take of the Pills of *H cum Agarico* one Scruple, *Mercurius Du* well prepared 15 gr. Extract of Caſto nough to form 'em into Pills: The Body ing prepared and purged, Bleeding is very good; for *Lindanus* obſerves ri that when the Menſes comes on, you o to bleed in the Arm, and when they Fl but ſlenderly or ſtop ſuddenly then to b with Cupping-glaſſes on the Thigh, the Feet, with the Lancet.

Take the *Arcanum Duplicatum* four S ples, Caſtor half a Dram, Myrrh Scruple, Mace and Saffron, of each a Scruple; make a Powder, whereof half a Dram in the following Ve

for a Dose. Take Mugwort Water Compound three Ounces, Cinamon Water one Ounce, an Oxes Gall half an Ounce, Syrup of Cinamon six Drams for a Potion. Or, Take round Birthwort half a Dram, Leaves of dry'd Savine one Dram and a half, *Dictamny* of *Crete*, and Troches of Myrrh, of each one Dram; choice Cinamon two Drams, white Sugar two Ounces, make a Powder which is excellent for the stoppage of the Courses, whereof take two Drams in a Draught of good Chicken Broth wherein is boil'd some Cinamon, Mace, and Saffron. Take the Extract of Bayberries, Savine, Centaury, and Marygold, of each one Ounce; Salt of Balm and Savine, of each half an Ounce, *Borax* one Ounce and a half, Saffron two Drams, of the *Pil. Aloephangina* one Ounce; make a Mass of Pills, with Oil of Cloves and a little Cinamon, of this give one Scruple, Night and Morning. Take of old Venice-Treacle five Ounces, Myrrh two Ounces and a half, Saffron and Cinamon, of each one Dram, Camphire two Drams, pour thereon very good Spirit of Wine three Fingers High, extract a Tincture over a gentle Heat, which being pour'd off by Inclination, add thereto a fifth part of Spirit of Tartar: The Dose is a Spoonful in Wine or Mugwort Water.

Take of Aloes Succotrine six Drams, choice Myrrh two Drams, extract of *Calamus Aromaticus*, and *Carduus Benedictus*, of each one Scruple, extract of Gentian Root, Long Birthwort, and *Dictamny*, of each 5 gr. Saffron 10 gr. *Borax* 18 gr. Oil of Amber 8 Drops, *Pulp* of Elder sufficient to make a Mass of Pills; the Dose is a Dram Night and Morning for some Time, drinking after a few Spoonfuls of Hysterick Water. Take Sun-dew, Aniseed, of each half an Ounce, *Dictamny* and Castor, of each one Dram, Saffron half a Dram, bruise and boil them in White-wine, to which add Spirit of Hartshorn and Amber of each one Scruple, and give it to drink in the Morning Fasting. Take of the *Fætid* Pill one Dram, *Gum Sagapene* dissolv'd in Vinegar, Myrrh, and Volatile *Sal Armoniac*, of each half a Dram, Tartar *Vitriolate*, Saffron and Castor, of each 15 gr. extract of Gentian, Savine, of each half a Scruple, black Hellebore one Scruple, distill'd Oil of Mace, and Mint, of each four Drops, make into Pills.

The *Discolouration of the Menses* is either when they incline to a Whiteness, from the Pituite and Imbecility of the Ventricle, or it may proceed from a *Pus*, and then Ulcers are lodg'd in the *Uterus*, from whence Matter will follow; or else it happens when the Menses give a yellow or greenish Cast, which proceeds from the *Bile*; otherwise the Colour becomes Livid, of a dark Purple, from adust melancholy Blood; in these cases *Mercurius Dulcis* mix'd with proper Catharticks are most Efficacious; as Aloes Rosated two Scruples, *Mercurius Dulcis* one Scruple, Oil of Savine 3 Drops, *Elixir proprietatis* 20 Drops, to form 'em into Pills. Or, Take *Scordium* Balm, Centaury Flowers, of each one Handful, Briony Roots one Ounce, black Hellebore prepared one Dram and a half, choice *Sena* one Ounce, Salt of Mugwort two Drams, reduce these into Powder, and give a Dram thereof 3 times a Day; and in order to promote Sweat, Take Harts-horn powder'd one Scruple, Raspings of Human Scull half a Scruple, *Bezoar Jovis* 12 gr. mix for a Powder. Or, Take *Antihecticum Poterij* 15 gr. *Antimony*, *Diaphoretick* one Scruple, *Facula* of Briony 4 gr. Mix.

The Cure of the immoderate or disorderly Flux of the *Menses* consists, first in allaying or calming the extraordinary Fermentation and Effervescence of the Blood, and to reduce it by a gentle Coagulation; secondly, to thicken and encraffate, and to coagulate in some manner the too fluidness of the Blood; thirdly, to Contract, restrain and strengthen the Vessels that are too much Relaxed, by Astringents. The Rules already given to proceed by general Methods or Medicines in this case are False; for the bleeding commonly used rather increases the Flux, and the Purgatives irritate and augment the Fermentation. Therefore it is better to follow these or the like Prescriptions.

Take Spicknard Flowers, Dragon's Blood, of each in fine Powder one Scruple, Plantane Water, and Roses, of each one Ounce and a half, make a Julep to be taken by Spoonfuls, to stop the Flux. Or, Take Tincture of red Coral 20 Drops, Syrup of

white Poppies one Ounce, add this to the former Julep. Take Tormentil Root and Biſtort, Plantane Seeds, of each one Dram, red Coral prepared, *Lemnian Earth*, of each two Scruples, Camphire and Balauſtian Flowers, of each half a Scruple, Sugar of Lead 16 gr. make a Powder, divide into eight Parts, whereof take one at a time in a Glaſs of Claret.

Take red Coral prepared, yellow Amber, Bole, Dragon's Blood, of each two Drams, Plantane Seeds, *Borax* calcined, of each one Dram, *Laudanum* ſolid 4 gr. extract of *Crocus Martis Aſtringens* one Scruple, Syrup of dry'd Roſes ſufficient to make an Electuary, with which many have been cured, after 3 or 4 Years Flux, ſaith *Hilaire*. Take of old Conſerve of Roſes ſix Ounces, *Diagdoniatum* without the Species three Drams, red Coral, Dragon's Blood, Human Bones calcined, of each one Dram, Troches of *Karabe*, *Crude Alum*, Plantane Seed, of each two Scruples, *Laudanum ſolid* 6 gr. Syrup of Cinamon, enough to make an Electuary. This given 3 times a Day will cure obſtinate *Hæmorhagies* of the Womb, even after Abortion, after other Methods h failed.

Take Frankincenſe, Maſtich, Amber each two Drams and a half, *Benjamin*, N megs, *Myrtle* and *Laudanum*, of each Dram, red Roſes and *Balauſtians*, of a Dram, Mucilage of *Gum Tragacanth* m with Roſe-water, what ſuffices to form into Troches to fume the Privy Parts th with. Take a Pugil of Sympathetick Powd diſſolve it in warm Water, and put th in a Rag dip'd in the Patient's Blood. T Remedy is ſafe, and frequently ſucceeds, only in an ordinary Flux of the Wo but likewiſe after Abortions. Take of Patient's Blood that is pure, without a mixture of Urine, put it to dry in a Sho red Hot, over the Fire, and give the weig of a Crown Piece hereof to the Patient drink in Claret: Repeat it 3 times and Flux will ſtop. The Juice of Plantane, Plantane bruiſed and apply'd upon Breaſts, or to the genital Parts, with a l tle Vinegar, will put a check to the Fl from the Womb: So Frog-ſpawn Wa mix'd with Vinegar will do the ſame thi

Of the Suffocation of the Womb, or Hyſterick Fits, *with the* Whites *or* Gonorrhea, *and the* Greenſickneſs.

THE Cure of *Hyſterick Fits* conſiſts in correcting and altering the Morbifick Acid of the Inteſtines to hinder the generation or breeding of Wind, and to allay and quiet the unruly Motions of the Spirits, and the Convulſions that ſucceed them; which is done by Lixiviate Salts, Volatile, ſpirituous and oily Medicines. We are firſt to have repect to the time of the Paroxiſm, by application of Fætids to the Noſtrils; as the Feathers of Wild Fouls burnt under the Noſe of the Patient, the Hooſs of Horſes, Snake Skins, and the like Volatile Fumes; as *Aſſafætida*, Oil of Tartar and Amber; in the next place by Ligatures and rubbing of the lower Region of the Belly, and applying of diſcuſſing Clyſters to expel Wind, and Cupping-glaſſes to the Thighs, and ſometimes the very Groins; ſometimes by putting Sweets up the *Pudenda*, as Civ Oil of Nutmegs, *&c.* Internally, by givi of the Volatile Salt of Amber, and Har horn, with Powder of Walnut Flowe Raſpings of Human Scull, Caſtor, and t like, in Pennyroyal, Treacle-water, C Externally apply a Plaiſter made of Moth wort, in Beef Suet, or boil'd in Freſh Bu ter, to which add *Gum Tacamahaca*, and G *ranna.*

Out of the Fits *Purgatives* are to be a miniſtred, with ſome Hiſterical Specifick *Pil. Fætida* one Scruple, Scammony ſulph rated, Reſin of Jalap, of each 6 gr. Oil Amber, extract of Caſtor, of each 4 g make into Pills, with Balſam of *Peru.* C Take *Pil. Stomach. cum Gummis* one Scrup *Digridii* 10 gr. *Galban. Ammoniac*, of each Scruple and a half, make into Pills, wi Balſa

ſalſam of Amber, or that of Sulphur, with
Oil of Turpentine. After this may be uſed
e following Forms; Take extract of Ca-
or and Saffron, of each 12 gr. Mother of
earls one Scruple, Oil of Angelica, Ani-
ed, and Amber, of each two Drops, Take
em in Cinamon Water half an Ounce,
adiſh Water two Ounces. Tincture of
ffron a Dram, *Laudanum* Liquid twenty
rops, make a Potion.

Take Pennyroyal Leaves, Mint, and Rue,
each two Handfuls, Lavender Flowers
o Pugils, Lovage Seed and Bayberries, of
ch half an Ounce, Myrrh two Drams,
utmegs one Dram, white Wine 3 Pints,
ſeſe all for four Hours in *Balneo Mariæ*,
d then diſtill. Take of this Antihyſte-
ck Water two Ounces, Citron Peel one
unce, Treacle ſix Drams, Spirits of *Sal*
rmoniac one Scruple, Tincture of Caſtor
e Dram, Oil of Amber four Drops, Sy-
p of Mugwort ſix Drams, make a mix-
re, whereof take a Spoonful or two from
me to time as occaſion ſerves. Take Pæony
d Briony Roots, Orange Peels, of each
ee Ounces, Leaves of Mugwort, Mo-
erwort, Balm, Pennyroyal, Rue, Savine,
d Elder Flowers, of each a Handful,
yrrh and Caſtor, of each half an Ounce,
ffron two Drams, Macerate in *Spaniſh*
ine 24 Hours, Walnut and Orange Flow-
Water, of each a Quart; make a Diſtil-
ion in a moderate ſand Heat, and uſe it
Hyſterick and other Uterine Caſes, from
poonful to two or three.

A Spirit againſt Vapours and Suffocation
the Womb. Take long and round Birth-
rt, Pæony and Valerian Roots, of each
o Ounces, of Caſtor one Ounce, dry'd
s of Wormwood, Mugwort, Tanſie,
otherwort, Elder Flowers, and Camomil,
each a Handful, cut and bruiſe them,
d having infuſed them 3 Days in 3 Pints
Spirit of Wine rectified, diſtil in *Balneo*
ariæ, according to Art. Give two or
ee Drams of this at a time in any Hyſte-
k Water or Decoction; or elſe apply it
ly up the Noſtrils, or rub the Temples
Navel therewith.

n Elixir for the ſame purpoſe. Take the
mical Oil of Wormwood, Hyſſop,
nnyroyal, Motherwort, Rue, Amber,
Savine, of each a half Scruple, Tinc-
ture of Saffron and Caſtor, of each two Ounces, white Sugar, Mugwort, and Elder Flower Water, of each four Ounces, make an Elixir according to Art, by Digeſtion, Filtration, *&c.* and give thereof from half a Spoonful to two Spoonfuls, a little before or after the Fits.

Take *Aſſafœtida*, the Juice of Mugwort and Tanſie, of each half an Ounce, Rue in Powder four Ounces, Caſtor half an Ounce, Saffron two Drams, *Olibanum* and Myrrh, of each two Ounces, Oil of Savine ſix Drams, Balſam of *Peru* three Drams, Linſeed Oil one Pound. Dry the Rue in the Shade, then powder it, and mix with the Juices. Powder the *Olibanum* and Myrrh, and mix 'em with the Balſam, and the Caſtor and Saffron together, with the Oil of Savine, after this mix by degrees the Linſeed Oil with the Juices, till all be reduced into a Liquid Conſiſtence. Put the whole Compoſition in a Cucurbit well ſtop'd, and ſet it to digeſt in Horſe Dung for 5 or 6 Days, after which put it into a Retort luted, and proceed to Diſtillation as Art directs; preſerving carefully in a Vial well ſtop'd, the Oil that flows from thence, it being ſinglar for Suffocations, if the Umbilical Region be anointed therewith Night and Morning. Or, Take Oil of Caſtor two Drams, Oil of Amber one Dram, Spike half a Dram, Camphire half a Scruple, or of the Oil 6 Drops. Mix together, and anoint the Region of the Navel with it as before directed.

Take Magiſtery, or Bezoar of Tin, Mother of Pearl, red Coral prepared, of each one Dram, rectified Oil of Amber one Scruple; mix together, and grind to a ſubtle Powder, which keep for uſe. This cannot receive too great an Encomium for the preſent relief it gives in the moſt violent and deſperate Suffocations of the *Matrix*, and preventing their return you may give one Scruple, in ſome Hiſterick Water during the height of the Fit; and repeat the ſame 3 or 4 Mornings afterwards faſting, to preſerve the Patient from any Return.

Take Pennyroyal Water two Ounces, Swallow Water with Caſtor one Ounce, Elderberries three Drams, Spirit of *Sal Armoniack* one Dram, *Laudanum* ſolid and Camphore, of each 3 gr. Syrup of Orange Peels

ſix Drams; make a Potion to prevent the return of the *Paroxiſm*, after which repeat it for a conſiderable time together, till there appears no Symptoms of a Relapſe: There are preſervative Pills to be made of Briony, Caſtor, *Aſſafœtida*, Volatile *Sal Armoniack*, Camphire, and Powder of the After-birth, or a Spirit made thereof by Fermentation and Putrefaction, is a very good Specifick.

For an *Hyſterick Clyſter* to be adminiſtred in the Fit; Take of Angelica Root one Ounce, Fennil Roots half an Ounce, Leaves of Motherwort, and Lovage, of each an Handful, Camomil Flowers two Handfuls, of the four hot Seeds, of each one Dram, boil all in a due quantity of Water; add to nine Ounces of ſtrained Liquor, Electuary of Bayberries four Drams, Caſtor one Dram, the diſtill'd Oils of Cumm Carui, and Amber, of each one Scrup make a Clyſter.

For a *Sneezing Powder*: Take of Caſtor Scruple, long Pepper 15 gr. white Helleb half a Scruple, Pellitory of the W 6 gr. let this be ſnuft up the Noſe to m the Hyſterick Patient Vomit. For a Balſa Take the Tears of *Aſſafœtida*, *Galbanum*, *poponax*, *Sagapenum*, and *Ammoniac*, of e one Dram, diſtill'd Oil of Rue, Am and Juniper Berries, of each one Scru make the Gums run in a hot Water, mix the Oils ſo as to make a ſolid Bal which keep for uſe. This is very prope abate the Vapours, being put up the N and to provoke the Terms by anoin the Navel and bottom of the Belly th with.

Of the Fluor albus *and* Gonorrhea.

THE Cure of the *Fluor albus* or Whites in Women depends upon theſe five things. Firſt, Bloodletting is to be avoided, becauſe of the *Cacochymia*. Secondly, Diſcuſſion is beſt perform'd by Decoctions of the drying Woods; as *Guajacum*, *China*, *Lentisk* Wood, *&c.* Thirdly, We are to have regard to a dry Diet, and a thin Air. Fourthly, We are to inſtitute Aſtringents and Corroborating Medicines. And Fifthly, Much Sleep is to be prevented, eſpecially lying upon the Back, which adds to the Inflammation of the *Lumbares*. If this Diſeaſe ariſe from any other Part beſides the Womb, we muſt direct the Cure to that Part; but let it proceed from what Cauſe ſoever, the Chalybeate or Vitriolick Mineral Waters are always uſeful. Hot Baths are to be ſhun'd, and Cold Baths inſtituted in their ſtead, as of the greateſt Conſideration in this Caſe. The Cure of this as well as the ſimple *Gonorrhea* conſiſts in correcting the poiſonous Acid, by appropriate Remedies, and giving a proper Tone to the Parts which are too much relaxed by their Acrimony.

Proper Remedies for the *Whites* and *Gonorrhea* are as follows: Firſt, Take the Juice of a Lemon, a little fine Turpen and as much Camphire, the white o Egg, diſſolve all in a little Roſe or Pla Water, and ſweeten with double re Sugar: Drink this as a Potion for 4 Days, in the *Fluor albus*. Or, Take Mint three Drams, Orrice Roots, and of each a Dram, Lettuce and Poppy S of each half a Dram, white Sugar Ounce; make a Powder, and take an Ounce of it in any Chalybeate Wa Pints; or take the following Confe with the Waters, as Pine Nuts, Cucu and Gourd Seeds blanch'd, Raiſins, o half an Ounce, Cinamon, Mace, See *Agnus Caſtus*, of each one Ounce, Cam one Dram, *Japan Earth* two Scruples; a Confection with Sugar, whereof tak an Ounce every Morning with the M Waters for 3 Weeks. Or, Take extr *Tormentil* two Scruples, Powder of ſpawn, *Agnus Caſtus*, and Plantane of each one Scruple, Turpentine half a Dram, Camphire 12 gr. Doſe of Pills, to be taken as the f Preſcriptions; or Pills made with G *rabick*, *Tragacanth*, *Bole*, Powder of *tles*, and Turpentine, of each equal

with Syrup of dry'd Roſes qſ. or make an Opiate of the 4 cold Seeds blanch'd, *Acacia*, red Coral, Pearl, of each one Dram, white and red Ben, of each 2 Scruples, Opium 1 Scruple; make an Opiate with Syrup of Myrtles, whereof give the quantity of a Nutmeg at Bed-time.

In a Virulent *Gonorrhea*, or that attended with a ſharpneſs of Urine, and heat of the Loins, after due bleeding and repeating as occaſion requires, give for ſome Days the following Emulſions. Take Melon Seeds, *Agnus Caſtus*, of each 2 Ounces, white and red Poppy Seeds, of each 1 Dram, Purſlane, Cinamon Water, with Barley, of each 18 Ounces, to which add Nitre fixed with Antimony 1 Dram, Antimony, Diaphoretick 2 Drams, ſweeten with Tablets of *Manus Chriſti* pearled. Take of the 4 cold Seeds 6 Drams, white Poppy Seed 2 Drams, ſweet Almonds half an Ounce, Barley Water half a Pound, Lettuce and Water Lilly Water, of each 2 Ounces, Roſe Water 1 Ounce; make an Emulſion, to which add ſweet Spirit 1 Dram, Syrup of Violets 2 Ounces.

The Humours being tempered and ſweetned by this means from their Sharpneſs, it will be neceſſary to purge the Patient, for which purpoſe we make uſe of Pills made of Turpentine, Rhubarb, or thoſe of Fumitory and Turpentine, with *Mercurius Dulcis*; or elſe make a Bolus with Turpentine, of *Cyprus*, or *Chio*, Rhubarb and *Mercurius Dulcis*, or ſome other things; as *Troches*, *Alhandal*, or extract of black Hellebore, if we are jealous of any Venereal Virulency.

Take *Caſſia* extracted 1 Ounce, Rhubarb and Cream of Tartar, of each 1 Dram, *Diagridium* 4 gr. make a Bolus. Take of Tamarinds 2 Ounces, boil in two quarts of White-wine to a conſumption of a third part; add to the ſtrained of clean *Sena*, Liquorice, red Roſe and Coriander Seeds, of each 2 Drams, after an infuſion all Night, give this to the Patient three Days together, and Night and Morning give a Bolus of 3 Drams of Turpentine, and a Dram of Rhubarb, with a little Sugar.

An Apozem in the *Fluor albus* or *Gonorrhœa*. Take Comfry 1 Ounce, Horſetail, Daiſies, Knotgraſs, of each a Handful, Sorrel a Handful and half, Seeds of Plantane and Mallows, of each half an Ounce, red Roſes one Pugil, Liquorice 3 Drams; boil all in a ſufficient quantity of Plantane Water to half; when cool add Syrup of Purſlane and Myrtles, of each 1 Ounce and a half.

Pills *for the ſame uſe*. Take *Venice Turpentine* 4 Ounces, Salt of Amber half an Ounce, extract of Juniperberries, made with Flegm of Alum 1 Ounce, Bole and *Terra Sigillata* prepared as the Juniper, of each 2 Ounces, extract of *Balauſtians*, made with an Acid Spirit; Orrice Root, and *Agnus Caſtus* Seed, of each 2 Drams, Dragon's Blood half an Ounce, Rhubarb 1 Ounce, *Crocus Martis Aſtringens* half an Ounce, Camphire diſſolved in Chalybeate Water 2 Drams, boil half the Turpentine in an Earthen Pan, with Plantane Water and White-wine, till they are conſumed away; then add to the Turpentine the other Drugs, and form them into a Maſs of Pills, which keep in an oiled Bladder with Care: They Deterge, Agglutinate, dry and ſweeten at the ſame time, and are ſingularly good in the Whites, and to ſtop the *Gonorrhœa*, being taken 6 or 8 about the ſize of a Pea, in the Morning, three Hours before Eating, and continued for the ſpace of 8 Days.

Take of Biſtort Root, Tormentil, and Water Lilly, Ivyberries, Lettuce Seed, Rue, *Agnus Caſtus*, Amber, Maſtick, *Olibanum*, Dragon's Blood, Nutmeg, of each half an Ounce, *Venice Treacle*, enough to form into Pills, which are very much valued to ſtop a *Gonorrhœa*, when it is proper to be check'd, taken Morning and Evening for ſeveral Days.

Take of dry Mint 3 Ounces, of Lettuce Seed, Rue, *Agnus Caſtus*, of each 2 Ounces and a half, of Orrice 2 Ounces, Dictamny, of *Crete* 6 Drams, white Sugar half a Pound, powder the whole, and having mix'd them in a Glaſs Retort, add *Venice Turpentine* 5 Ounces, White-wine a Quart, then diſtil in a Sand Furnace. The Doſe is two Spoonfuls an hour or two before Dinner, this Water is very Efficacious, to ſtop an inveterate Running after Univerſal Medicines, and ſpecifick Purgatives have preceded.

To make the Medicinal Stone Powder, mix together red *Colcothar* of Vitriol, that remains in the Retort after Diſtillation;

or for want of that Calcine to a redneſs, 2 Ounces of *Litharge*, of Alum and Bole, of each 4 Ounces; mix them together in a glaſed Pot, and pour upon them good Vinegar till it over-top two Fingers breadth, ſtop the Pot, and leave it in Digeſtion two Days; then add Nitre 8 Ounces, *Sal Armoniac* 2 Ounces, put the Pot upon the Fire, and conſume away the Moiſture. Calcine the Maſs that remains about an Hour over a great Fire, and keep it for Uſe. This is a good Medicine to ſtop the *Gonorrhœa*, diſſolving a Dram in about 8 Ounces of Plantane or Smith's Forge Water, to make an injection into the Yard: It is likewiſe good for the Eyes, in the Small Pox, 7 or 8 Grains being diſſolv'd in 4 Ounces of Plantane or Eye-bright Water, for a Colliry: It is proper to ſtop Blood, apply'd externally upon a Wound.

This Injection which follows is excellent for Ulcers of the *Urethra*. Take of Goat's Milk 6 Ounces, Plantane and Roſe Water, of each 7 Ounces, of Ceruſe 6 Drams, *Spodium* powder'd, Cryſtal, Roch Alum, of each half a Dram, and make an Injection. Take good Wine, and Plantane Water, of each 2 Ounces, Sugar of Lead 1 Scruple, Camphire 12 gr. 'Tis a ſure Remedy againſt Inflammations and Tumours of the Glans and Prepuce. Take New Cow's Milk what quantity you pleaſe, Elder and Roſe Flowers, of each a Handful, boil them, and then add to the ſtrain'd Liquor Sugar of Lead 8 Grains. The cooling Ointment of *Galen*, and that of Tutty are proper for Ulcers of the Prepuce.

Cataplaſms made of Barley or Bean Flower, Cummin Seed, Camomil Flowers, and Melilot, powder of Roſes and Oxymel are good againſt Tumours of the *Scrotum*. Take Turbith Mineral, red Precipitate, mix 'em with ſome Mugwort, and apply upon a Wax Candle into the *Urethra*, to take away the Carnoſity or Caruncles thereof. Or, Take Oil of Roſes and Ceruſe, of each one Dram, of Tutty prepared half an Ounce, Camphire 2 Drams, of Aloes, Male Frankincenſe and Myrrh, of each 2 Scruples, Tallow half an Ounce, make an Ointment without Fire, becauſe of the Camphire burning, by beating in a Leaden Mortar, this will conſume the Carnoſity, being apply'd with the Candle.

But above all Remedies the Water drawn by Diſtillation from *Acorus*, and impregnated with its fix'd Salt, is the moſt incomparable, not only to ſtop a *Gonorrhœa*, but likewiſe the *Whites*, and exceſs of Menſtrual Purgations. The Roots of *Filipendula*, or the Bark of the Root of the Mulberry Tree a Dram, given in Claret ſtops the *Whites* and Courſes, more effectually than *Crocus Martis Aſtringens*. Take the ſame of Plantane a Glaſs, *Colopheny* in Powder, make a Potion, which repeat 3 times or more; likewiſe the Juice of Yarrow 3 Ounces, given in Syrup of Coral is very Efficacious. Take Roots of Tormentil and Biſtort, Plantan Seed, of each a Dram, red Coral prepared, Seal'd Earth, of each 2 Scruples, Sugar of Lead and Camphire, of each half a Scruple, make a Powder, which divide into 6 Parts, of which take one Morning and Night in a Glaſs of ſtrong Claret.

The *Greenſickneſs* is cured, firſt of all by Blood-letting, eſpecially in ſuch where the diſorder is of a freſh Date, and the Blood not degenerate into another Humour; in the firſt place if the Suppreſſion ariſes from Evacuation of the Blood; ſecondly by Purgation; thirdly from Obſtruction, in which regard is to be had to all the *Viſcera*, and firſt to the Suppreſſion of the *Menſes*. In Diet we are to avoid the *Acid*, and in *Cathartick*s always have conſideration for Digeſtive and Aperitive Medicines; ſeveral forms whereof follow. Take *Crocus Martis Aperit.* half an Ounce, Salt of Succory and Aſh Keys, of each 1 Dram. The *Fæcula* of Briony 2 Scruples, make a Powder, and give from a Scruple to half a Dram. Or, Take Tartar Vitriolate 1 Dram, Salt of Scurvy-graſs, Succory and Wormwood, of each a Scruple, divide into 6 equal Parts. Or, Take Tincture of Steel, of *Mynſicht*'s, *Vitriolum Martis* 2 Drams, *Elix. Proprietatis* 1 Drams; mix and give from Forty to Sixty Drops.

If the Patient's Strength will permit, give Purges and Vomits, as *Mynſicht*'s, Powder of Jalap 1 Scruple, Troches of *Agaric*, *Crocus Martis* ſaccharated, of each 12 gr. Or Powder of the Roots of Jalap 1 Scrup. *Vitr*

Vitriolum Martis, *Fæcula* of Briony, Scammony ſulphurated, of each 6 gr. Tartar vitriolated half a Scruple, Conſerve of Roſes *q.ſ.* for a Bolus. Or, Take extract of *Diacarthamum* half a Dram, Scammony 6 gr. Conſerve of Balm: Take Pills of *Ammoniac* and Tartar of *Quercetan.* of each half a Dram, Scammony ſulphurated 12 gr. *Troches Alhandal* 6 gr. make 24 Pills. Or, Take Pills of *Sagapen* 1 Scruple, Reſin of Jalap 6 gr. extract of *Troches Alhandal* 4 gr. with Syrup of Steel, make into Pills. Take *Extract. Diacartham.* 1 Scruple, *Troches Alhandal* 6 gr. *Crocus Martis* half a Scruple, make into 12 Pills.

Take *Extract. Diacartham.* half a Dram, diſſolve in ſome Aperitive Water, as that of Parſley, Radiſh, *&c.* to which add Scammony *Roſat.* 6 gr. Tincture of Steel 1 Dram, Syrup of the 5 Opening Roots 1 Ounce, make a Potion. Or, Take Electuary *Catholicon*, and *Extract. Diacartham.* of each two Scruples, diſſolve them in the Aperitive Decoction, and add thereto the Laxative Syrup of Apples. Take the Purging Catholick Powder two Scruples, Rhubarb one Scruple, ſhake them in 2 Ounces of the Decoction of the Aperitive Roots, and ſweeten with Syrup of Peach Flowers, for a Purging Draught. Take Agrimony, Dodder, Horehound, of each a Handful; Flowers of Borage, Bugloſs, Succory, Broom, Liverwort, of each two Pugils, *Monk's* Rhubarb 1 Ounce and a half, Roots of black Hellebore, Fern, of each 1 Ounce, of the 5 opening Roots, of each 2 Drams, Seeds of *Carthamum* 6 Drams, white Agarick 3 Drams, choice Cinamon, *Caſſia Lignea*, of each 2 Drams, Cloves 1 Dram and a half, Spice 1 Dram, Salt of Tartar 1 Ounce, make a Bag thereof for a Diet Drink, in Whey, Water, *&c.* Take white Agarick 2 Drams, Jalap Roots 4 Scruples, ſprinkle them over with Tincture of Salt of Tartar, and then infuſe all Night in ſome Aperitive Water or Decoction, and to the ſtrained Liquor add Syrup of Apples Laxative 1 Ounce. This being regularly purſued we are next to have recourſe to Reſtoratives and Strengtheners; as the Cachectick powder of *Quercetan* 2 Drams, Ivory without Fire, *Species Diarrhodon Abbatis*, of each 1 Dram, with Sugar diſſolv'd in *Scorzonera* Water, make 'em into Lozenges, which eat frequently.

Of the Furor Uterinus *or Womb* Melancholy.

THE Cure of this Diſeaſe is affected either by Blood-letting, where there is a *Plethory*, or gentle Purging, with cooling Alterative Medicines to temper the heat of the Bile, and diſcharge the *Serum*. Such as Pills of Fumitory 1 Scruple, Scammony ſulphurated 8 gr. Sugar of Lead 4 gr. Or, Take Water of the Water Lilly an Ounce and a half, Syrup of the ſame half an Ounce, the Catholick purging Powder 2 Scruples, or Syrup of Succory, with Rhubarb one Ounce; Water Lilly Water half an Ounce, Scammony ſulphurated 8 gr. Alteratives and Coolers are ſuch as Lettuce, Purſlane, Rue, Hemp, Camphire, Hemlock, *&c.* Take an Emulſion of the 4 cold Seeds, made in Barley Water 4 Ounces, Syrup of Water Lilly an Ounce and a half, Sugar of Lead 1 Scruple, Camphire 8 gr. Doſe 2 or 3 Spoonfuls frequently. Take Hempſeed 2 Ounces, Lettuce and Purſlane Seed, of each 2 Drams, with Poppy Water, make an Emulſion, and ſweeten with Syrup of Water Lillies. Take Oil of Water Lillies 1 Ounce, Oil of Rue 3 Drams, Sugar of Lead 2 Drams; with this anoint the Reins and Genital Parts. Take Plaiſter of Hemlock, *q.ſ.* Malax with Oil of Water Lillies, and apply to the Womb in the uſual Form.

Where this is attended with *Melancholy*, Bleeding is to be order'd at the beginning, and that often in Bed; if the *Menſes* are ſuppreſs'd, then Bleed ſome Days before the Flux is expected, but if otherwiſe be more ſparing in that Evacuation: Such things as alter the Craſis of the Blood and Humours, and refreſh and exhilerate the Heart are the moſt ſerviceable: As Balm, Borage, Bugloſs, Cinamon, Roſemary, Lavender, the Cordial Species, and the like. The Tincture

or Eſſence of Borage or Balm, taken frequently in any Liquid, not only ſtrengthens the Womb, but comforts the Heart. Take *Species Lætificans Galeni* 1 Ounce, Tincture of Balm and Borage, of each half an Ounce, Sugar *qſ.* diſſolved in Roſe Water, made into Lozenges. Or, Take Conſerve of Balm 1 Ounce and a half, Conſerve of Borage, Marigold Flowers, of each 6 Drams, *Spec. Lætif.* of *Galen* 4 Drams, with Syrup of Orange Peels; make an Electuary, to which add Confect of Hyacinth 5 Scruples.

Such Evacuations as are appropriated to the Womb are always to be uſed in theſe Melancholy Caſes: As Extract of Hellebore and Briony, of each 1 Scruple, Antimony that purges downwards 6 gr. Conſ. of Fumitory *qſ.* to make into Pills, for a Doſe. Take Extract of black Hellebore 15 gr. Scammony ſulphurated 8 gr. Cinamon Water and Borage, of each half an Ounce, Syrup of Apples Laxative 5 Drams, make a purging Potion. Or, Take Extract of black Hellebore half a Scruple, Scammony Roſated 8 gr. The Aperitive Tincture, and that of Steel, of each 1 Scruple, Syrup of Succory 1 Ounce. Take Balm one Handful, Borage, Bugloſs, and Marygold Flowers, of each 3 Pugils, Roots of Fern an Ounce and half, black Hellebore 1 Ounce, *Sena* pick'd 1 Ounce, *Caſſia Lignea* 3 Drams, Salt of Tartar one Ounce, make a Bag, and put them therein for a Diet Drink, or Phyſical Wine, to be continued for ſome time.

Of the Nature and Cauſe of Barrenneſs, we have treated in another Place, and therefore ſhall only propoſe here ſome Methods of Cure, which depend in general upon Catharticks, Corroboratives or Alteratives: As to the firſt in making uſe of Purgation, the Phlegmagogues are of the greateſt uſe. Take the Phlegmagogue Extract 1 Dram, Reſin of Jalap 6 gr. Conſerve of Roſemary Flowers; make into Pills. Or, Take Eryngo Root 1 Ounce, Roſemary Flowers, Sage, of each 1 Ounce, *Carthamum* Seed, white Agarick, of each 3 Drams, *Seſeli* and *Ammios* Seed, of each 1 Dram, *Caſſia Lignea* and Cream of Tartar, of each half an Ounce; make hereof an Alterative Diet-Drink in Ale, Water, Whey, *&c.* Or, Take Agarick 3 Drams, *Mechoacan* half an Ounce, Roſemary and Sage Flowers, of each 2 Pugils, Cream of Tartar 2 Drams, infuſe all Night in White-wine 6 Ounces, to the ſtrained in the Morning add Syrup of *Aſa rabacca* half an Ounce.

Take Conſerve of Roſemary and Sage Flowers, of each half a Dram, the Catholick purging Powder 1 Scruple, Reſin of Jalap 4 gr. Syrup of Cinamon *qſ.* to make a Bolus.

For Reſtorative and Corroborating Medicine, Take Roſemary Flowers a Handful Sage and Lavender, of each half a Handful *Eryngo* Roots 1 Ounce and a half, Aniſeed and *Seſeli*, of each 3 Drams, Cinamon and Nutmegs, of each 2 Drams, *Caſſia Lignea* 1 Ounce and a half; cut and bruiſe them ſo as to make a Confection of them with Sugar, or to infuſe them for an Hyſteric Wine, whereof the Patient may drink an uſual Wine-glaſs twice a Day. Take the Specifick Decoction of *Quercetan* 6 Drams Syrup of Coral 3 Drams, Tincture of Saſſafras 1 Scruple and a half; mix for a Draught. Take Conſerve of Sage & Roſemary Flowers of each 1 Ounce, Briony Roots Candied 1 Dram, Nutmegs Candied half an Ounce *Seſeli* and *Biſhopſweed*, of each 1 Dram and a half, Cloves and Saffron, of each 2 Scruples, with the Juice of *Alkermes*; make an Electuary. Take of this about the quantity of a Nutmeg Morning and Evening: Drinking after it the following Cordial. Take Borage and Balm Water, of each 4 Ounces Cinamon Water made with Barley 5 Ounces, Roſemary Flower Water 6 Drams, Tincture of Coral and Saffron, of each 2 Drams *Galen's Species Lætificans* 2 Scruples, ſweeten with Syrup of Citrons.

Warm Baths are proper for Women in theſe Melancholy Diſorders, eſpecially ſuch as are prepared of the following Herbs and Roots. Take Mercury 3 Handfuls, Marjoram, Sage, Mugwort, Balm, of each 2 Handfuls, Roſemary, Pennyroyal and Motherwort, of each a Handful, Roots of Biſtort and Tormentil, of each 4 Ounces, Bay and Juniperberries, of each a Handful; cut and bruiſe theſe, then boil them in Spring Water for about an Hour, and let the Patient Bath in the Water and Herbs, as hot as poſſible, and after coming out of the Bath anoint the lower Region of the Belly with the following Liniment. Take Fox Grea

o

ne Ounce, Oil of Sage and Cinamon Seed, f each one Dram, Oil of Savine one Scru-le, Oil of Mace, by Expreſſion four Scru-les, Camphire two Scruples, *Sperma Ceti* two Drams; make a Liniment, wherewith anoint the Loins, Hypogaſtrium and Umbilical Region.

Of the Diſeaſes incident to Women with Child, and their ſeveral Cures. *From the ſame Authors as before.*

AMONGST thoſe Symptoms with which breeding Women are afflicted, in the firſt Months of their Gravitation, the *Cramp in the Legs and Thighs*, is very troubleſome, and may be reliev'd by anointing with Oil of Bays, rubing it in before a warm Fire: Some indeed recommend the Rings of the Sea Horſe-Tooth, likewiſe Elks Claws: Externally uſe *Mynſicht*'s Cramp Ointment 1 Ounce, Oil of Earth-worms half an Ounce: Or, Make a Liniment with Lime-flowers ſteep'd in Spirit of Earth-worms: Or, Make a Liniment with Oil of Camomil 1 Ounce, Earth-worms half an Ounce, Caſtor and Oil of Amber, of each 1 Dram; ſo Venice Treacle with Oil of Scorpions and Caſtor diſſolved in cold Water, which ſometimes alone relieve without the addition of any of the Volatiles.

Sciatica Pains.

Anoint with Oil or Spirit of Turpentine; beſides which all Arthritick Remedies prevail, as *Hartman*'s Gout Balſam, *&c.* So Flowers of Vervain and Mullein boil'd in Ale, and applied with a Cataplaſm or Pultiſe of Bread, and the white of an Egg, with *Naſturtium*, Pennyroyal, Roots of Briony, ſtamp'd and made up together; Goat's Dung boil'd in Spirit of Wine, to which add powder of Juniper-berries makes an excellent Cataplaſm. Anoint with the Fat of an Hare boil'd in Spirit of Wine, to the Conſumption of the Spirit; likewiſe give Chimical Oils of Juniper, Bayberries, and the Fat of a Dog: Sage, Marjoram, Rue and Thyme, infuſed warm in Spirit of Wine; ſo Bags fill'd with Tanſie, and boil'd, after which ſprinkle them with Spirit of *Guajacum* and Roſemary. Take Salt of Tartar and Nitre, of each *qſ.* melt them in a Crucible, to which add Spirit of Wine for an *Epithemum*.

Of Loathing of Meat.

In this Diſorder there is no neceſſity for many Medicines, becauſe it ceaſes as the *Fœtus* grows; but if there be a great occaſion take care to avoid Evacuation, and to fortifie the Stomach by the *Elixir Vitrioli Mynſichti* taken 10 or 12 Drops in Water, or Wine and Water; *Paracelſus's Elixir Proprietatis*, the *Confectio Diarrhodon Abbatis* or the like, in two or three Spoonfuls of ſome Generous Wine, after which let the Patient eat Fleſh-meat, as Chicken, Capon, Rabbet, *&c.* avoid too much Liquids and Fat Things; and to Drink, the dryeſt and moſt Aſtringent red Wines, as *French* Claret. Take Smallage Seed 3 Drams, red Coral 1 Scruple, Spiknard, Long Pepper, of each 3 gr. Honey of Roſes *qſ.* make an Electuary to take Faſting, the Size of a Nutmeg; externally anoint the Stomach with Oil of Mint, Wormwood, Quinces, Myrrh, Maſtich, *&c.*

Of Women's Longing.

This is cured three Ways: Firſt by Diet, as Bread Macerated with Juice of Quinces or Pomegranates; by eating bitter Almonds Faſting; after Meat by eating of Grapes, Peaches, Pears, and Filberts, with other grateful Fruits, not too Acid, but beware of Fat and ſweet Meats. Secondly by purging gently with Rhubarb, and Conſerve of Roſes: Likewiſe eaſie Vomits agree wonderfully

derfully in this Caſe, ſuch as Oxymel of Squills 2 or 3 Spoonfuls in ſome convenient Vehicle, *&c.* Thirdly by Diſcuſſing of Crude Humours that lodge upon the Stomach, for which purpoſe Orange Chips candied, Citron and ſuch like are agreeable. Take the Powder of both Corals, Hartſhorn, raſp'd Ivory, *Margarit*, of each 1 Scruple; make into Lozenges or Troches, with Sugar diſſove in Roſe-water, and a little *Gum Tragacanth*, and let the Patient eat a few of theſe before Meat: Where the Stomach is Languid and wants more Aſſiſtance, Take Oil of Nard, Wormwood, and Mint, of each 1 Ounce, Vinegar 1 Ounce and a half, Seeds of *Amneos*, Cummin, powder of *Cardamoms*, and Roots of Capers, of each 1 Dram, boil them to the Conſumption of the Vinegar, and with white Wax make a Liniment, to anoint the Region of the Stomach: Some Phyſicians mightily commend Filings or Ruſt of Iron, if taken for ſome time a Dram a Day in a little Conſerve of Roſes or Wormwood, drinking afterwards a ſmall Glaſs of good Stomachick Wine.

Of Puking and Vomiting.

This is what ought not to be entirely ſuppreſs'd, nor can it eaſily be done, for it will ceaſe of its own accord in 2 or 3 Months time, tho' ſome carry it on to the Birth; yet if it be exceſſive and beyond Bearing, a gentle Vomit is proper at firſt, and afterwards Evacuation by Stool, with Rhubarb, *Sena* or Aloes, according to the Nature of the Caſe and Conſtitution of the Patient. When this is done the Ventricle ought to be ſtrengthen'd by Internals, which are Stomachical Specificks, with which the Diſpenſatories abound, it is ſerviceable to ſtrew a little Rhubarb, and to uſe Conſerve of Quinces candied, *Myrabolans* and Myrtleberries, Orange, Lemon, and Citron Peels: A Toaſt of Bread well baked in a Glaſs of Claret, or that and Water: Likewiſe Milk and Water, with Syrup of Woodſorrel or Lemons, and Conſerve of Roſes, externally anoint the Stomach with Oil of Wormwood, Maſtick, *Tacamahaca*, or the like; otherwiſe apply a Plaiſter to the Stomach, made of *Laudanum*, *Tacamahaca*, of each 2 Drams, Oil of Maſtich and Mint, of each 6 D[rams] Balſam of *Peru qſ.* for a Plaiſter.

Of the Gripes or Belly-Ach.

This is remedied the ſame way as the [Inf]lation of the Womb: Regard muſt be [had] to Diet, that it be hot and dry, that r[aw] unripe Fruits be Prohibited: It is likew[iſe] good to chew Cinamon, Aniſeed, Cit[ron] and Orange Peels, the powder of which [may] be given in Wine, or diſtill'd Cordial W[aters]: Fennil Seed eaten with Sugar exp[els] Wind powerful, and the diſtill'd Oil [ap]ply'd to the Navel is of great Uſe. Or m[ake] a Bag to be laid to the Navel of Fen[nel] Seed, Aniſeed, Dill ſteep'd in ſome Aro[matick] tick Wine, or *Aqua Vitæ*: Clyſters may [be] ſafely given with the Chimical Oil of D[ill], Cummin and Bayberries, together with [the] Yelk of an Egg in half a Pint of Sack [or] *Malmſey* Wine: Avoid much unguents a[nd] moiſt Fomentations, which may dilate t[he] much, and procure Abortion; but you m[ay] apply Plaiſters to the Navel of ſtrain'd *G[al]banum*, *Laudanum*, *Tacamahaca*, *&c.* malax[ed] with a few Drops of Oil of Cummin, Di[ll], Fennil, Aniſeed, or Balſam of *Peru*.

Of Looſneſs, or a Scouring of the Guts.

A Looſeneſs or white Flux of the Belly [is] of dangerous Conſequence to Women wi[th] Child, for fear of Miſcarriages; therefo[re] the ſooner the better, if it be either *Lient[erical]* or *Dyſenterical*: For in a *Diarrhœa* th[at] proceeds from the abounding of deprave[d] Humours we muſt beware of Aſtringents; for though there is danger of Abortion i[n] letting the *Diarrhœa* continue, there is mo[re] danger both to the Parent and the *Fœtus* i[n] putting a check thereto before the plenitud[e] of Humours be Evacuated, therefore it [is] the beſt and ſafeſt Method in that Caſe t[o] have regard to Diet, and a *Regimen* to alte[r] the Habit of the Body by degrees, and chang[e] it to a better State.

The *Dyſentery* muſt be cured by good Diet, and Drinks of the beſt Wines, ſometimes Chalybeated; in the next place th[e] Humours muſt be expell'd by Evacuation together with corroborating Medicines, a[s] Syrup

yrup of Roſes, *Myrobalans* and Rhubarb: f the Blood abounds a Vein muſt be open'd, therwiſe the Humours temper'd by cooling lteratives, *&c.* of Sorrel, Purſlane, Violets, uglos, with Rhubarb and Conſerve of oſes: During this time the *Fœtus* is not o be neglected, but ſtrengthen'd with the dmiſſion of *Diaſcordium*, Venice Treacle innamon, Cloves, *&c.* If the Flux become yſenterick or *Cœliack*, adminiſter the fol- wing Opiate. Take Conſerve of red Ro- s 1 Ounce and a half, Bole, red Coral repared, Troches of *Carabe* and Maſtich, each half a Dram, ſolid *Laudanum* half a cruple, give a Dram of this in four Spoon- ls of Cinamon Water, at the ſame time ply to the Navel a Cataplaſm of Quince eds boil'd with Nutmeg, Maſtich, Mace, loves, *&c.*

Of the Tooth-Ach in breeding Women.

Tooth-Ach of which there is no ſurer a n of Conception, if from a Flux of Hu- ours is cured by a Bliſter, or applying a liſter to the Temples of Maſtich, *Taca- haca*, and Opium: We muſt mitigate e Pain with Anodyne Pills; there is like- ſe a Wine to be held in the Mouth, in hich Sage, Marjoram, Coriander, and Galls re been boil'd; or a Decoction of Fern, ſort, red Roſes and Sage, or the Vapour reof drawn into the Mouth. If the Pain oceeds from a cold Cauſe; Oil of Cloves, ge, Camphire, Box, *Origanum* are uſed, ng drop'd into the hollow Tooth, or held the Mouth with Cotton or Lint, the eth are to be rub'd with Pellitory, Pep- r or Cloves. If from a hot Cauſe nothing ieves the Pain ſooner than cold Water ld in the Mouth, and often Repeated. If m Acrid and Scorbutick Humours, then *ewalgicks* boil'd in Milk are beſt; becauſe e Milk tempers the Acrimony, but above Remedies is Camphire boil'd in Vine- , and the Liquor held juſt warm in the outh.

Of the Head-Achs and Vertigos.

The Head-Ach in breeding Women tho' Child grow large, yet will ceaſe of its own accord, but if it be very troubleſome and afflicting we muſt endeavour to repel it by gentle Means; whereof we have treated under the Diſeaſes of the Head, and ſhall refer you to that, both in the *Vertigo* as well as this Diſeaſe, in the mean time we ought to take notice here if theſe Vapours or Pains ariſe from the *Plethora* of the Mother during her Gravitation, and then Blood-letting muſt be inſtituted, but if the Diſorders ariſe only from the Stomach, then let 'em take the following Peptick Powders. Take of Coriander Seeds prepared 1 Ounce, Cinamon half an Ounce, Mace 2 Drams, Oil of Nutmegs 4 Drops, Sugar pearl'd 4 Ounces; make a Powder, which may be divided into 20 Papers, one whereof may be taken 3 times a Day.

Of the Cough in pregnant Women.

When the Abortion is dreaded this Cough is very dangerous, and ought to be maturely conſidered with all the care imaginable, becauſe the extenſion of the Diaphragm preſſes the Fund of the *Uterus* forcibly downwards: For this end freſh drawn Linſeed Oil, and that of Sweet Almonds, with the Mucilage of *Althea* and the like is to be made uſe of; alſo the Fumes or Vapours of Decoction of Marjoram, Hyſſop, Pennyroyal, Roſemary and Sage are to be received by the Mouth and Noſe: At length Pectoral Medicines ought to be exhibited either in Linctus, Lozenges, as the Matter is Hot or Cold, Thin or Thick, avoiding all ſweet Things that are too Hot and Glutinous, for they are Enemies to the Womb. The *Species Diatragacanth* frigid, *Diaireos*, the Aſtmatick Syrup of Garlick, *Paul*'s Betony, and *Scabins* are to be uſed in Decoctions with Oil of Fennil. Take Hyſſop a Handful, Nettle Seeds, and Orange Root, of each half an Ounce; make a Tincture, to which add Syrup of Betony, and Syrup of *Squills*, of each 1 Ounce; drink 3 or 4 Spoonfuls of this every hour or two. Take Syrup of Violets, Oil of Sweet Almonds, of each one Ounce and a half, *Carthamum*, Orrice Root in Powder, of each 2 Drams, *Sperma Ceti* 4 Scruples; make a Linctus.

Of the Palpitation of the Heart.

If this proceed from too great plenty of Blood, or a *Lipothymia* in the midſt of the time of Gravitation, which is a certain ſign of Miſcarriage, the beſt Method is to breath a Vein, and take ſuch quantity of Blood as is moſt agreeable to the Patient's Conſtitution, and the Nature of the Symptoms: Some in this caſe give Rhubarb, with Conſerve of Roſes, to purge off the Humours. But if the *Syncope* or Palpitation ariſe from Wind or Vapours; Cordials are to be exhibited, that have power to drive away the Malignant Vapours, as *Bezoar*, with Confect of *Hyacinth* and *Kermes*; Spirits of Lavender, Lilies of the Vally, *Scordium*, with Cinamon Water, Spirit of Balm, *&c.* Externally make an Unction with Oil of Scorpions, Cinamon, with Venice-Treacle: Let Cordial Bags be apply'd, fill'd with the Cordial Flowers, Yellow Sanders, Angelica, and *Species Diambre*: And anoint the Region of the Heart with Spirit of Lavender, *Sal Armoniac* ſuccinated, of each equal Parts.

Of the Hæmorrhage.

This Symptom is not without Danger; but if the Flux proceed from a plenty of Blood, Blood-letting muſt be adminiſtred, and Adſtringents, yet both with Caution: For Example, Take Syrup of Coral and Purſlane, of each 6 Drams; Plantane and Comfry Water, of each 1 Dram; Cinamon Water 6 Drams; Coral prepared 1 Scruple; make a *Hauſtus*, externally apply the Plaiſter of *Sanders*, with Oil of Maſtich, to the Right Side: Frictions are likewiſe ſerviceable, and Cupping upon the Upper Parts. So theſe following Medicines, Coral, Pearl, Seal'd Earth, Confect of *Hyacinth* and *Alkermes*, with Oil of Cinamon, Cloves, *&c.* if the *Cachochymia* proceeds from a Serous Acrid Humour, then the Matter is to be Evacuated and Temper'd: And it would be profitable to chew *Rhubarb* it ſelf, or with Conſerve of Roſes, and other Laxatives; as *Sena*, *Myrobolans*. Take Liquorice, and Succory Roots, of each 2 Drams; Wood-ſorrel, Agrimony, Endive, of each half a Handful; the Cordial Flowers, of each a Pugil; Aniſeed Fennil, of each 1 Dram; *Sena* 4 Dra boil them in Balm and Succory Wate to the ſtrained Liquor 4 Ounces; add *A na* 1 Ounce; Cream of Tartar 1 Dr Mix for a Draught. Concerning the u Aſtringents we ought to take notice i Blood is Grumous, and not deca ſtrength Succeeds, that Nature is ſuffi to expel the Enemy, and that then the is not to be ſtop'd with too great Aſt gents; but Corroboratives applyed ſtrengthen the *Fœtus*, and ſuch nouriſ Diet as may encreaſe the growth of the *brio.*

Of the Suppreſſion of Urine and Siege.

The firſt commonly happens from t rect form of the Woman, whereby the then preſſes upon the Neck of the Blad therefore the Woman ought to ſit or l ſuch times; and have the Region of Womb fomented with Baths made of litory, Mallows, *Althea*, Parſley Roots, ſeed, and ſuch like. But the Suppreſſio Siege, and Coſtiveneſs of the Body, m relieved by a Laxative Diet; together eating of Almonds and Raiſins, Prunes, ney of Roſes, *&c.* ſo gentle emollient ſters may be given without Danger; a Example. Take Barley Water, and M ton Broth *qſ.* Borage Flowers, and Pelli of the Wall, of each half a Handful this add Honey of Roſes 1 Ounce; Yelk of an Egg: Or they may uſe E lient Suppoſitories; but if there be da in the Suppreſſion of Urine remaining long, it is ſafeſt to provoke it by uſe o *Catheter.*

Of the Inflation and Diſtention of the V in the Thighs, Legs, and Feet.

This happens ſo, that they appear ſo times as if they were varicous from the w neſs of the Veſſels, and Inflammation ther, that relaxes and ſtretches their nicks; but after the Birth, and the C ſings, they return again to their uſual Therefore here is no great uſe of Medic but the Patient ought to take care of n

ſary Evacuation during the time of Gravi-ation, and to live ſparingly, if they are in-lined to be full of Blood: But if the Tu-mour be large in the Legs, or upon the Feet; we muſt take care to apply diſcuſſing and digeſting Medicines, and to foment the Part with a *Lixivium* of Vine-aſhes prepa-red with Wine, *Origanum* and Camomil. Or, Take Bean and Lupine Flowers, of each Ounces; Sulphur 1 Ounce, Pidgeon's Dung half an Ounce; make a Cataplaſm with Steel Water.

If the Feet Tumefie after Friction with Wet Cloths, we muſt anoint with a Lini-ment made of Oil of Dill, Camomil, St. *John's* Wort half an Ounce, Oil of Vitriol Dram; if the Part grow Red, have a care leaſt it Ulcerates or Degenerates into ſome Corruption. Take Oil of Roſes *qſ.* in which diſſolve and grind Seal'd Earth; add a little Wax, and make an Uuguent, with which anoint the Tumour: The Feet may be waſh'd in Silt Water, wherein Camomil, *Origa-num*, and Dill hath been boil'd. If the Tu-mours appear Livid, bleeding may be exer-ciſed with the greateſt Succeſs, even to the laſt Month of the Patient's reckoning with Child.

Of the Chaps and Breaches of the Skin of the Belly, after Child-bearing.

The Skin of the *Abdomen* is not ſo ſtretch'd in the firſt Conception as it happens after-wards, when it does not only occaſion a Deformity, but the Pain is very great in the Extenſion. To remedy this after the fifth Month, Laxative Liniments and Ointments may be ſafely uſed; as the Marrow of Veal, Oil of Sweet Almonds, Hen's Greaſe, and *Sperma Ceti*, waſh'd in Roſe Water, and beat up into a Pomatum. Or, Take Muci-lage of Linſeed, Fennygreek and *Althea*, of each 6 Drams; extracted in white Lilly Water, and form'd into a Liniment with white Bees Wax. The Wrinkles are to be prevented with Oil of Linſeed, Violets, St. *John's* Wort, Tutty, Lytharge, and Lead. Or, Take Oil of Lillies 1 Ounce; Deer's Suet half an Ounce; Camphire and *Sperma Ceti*, of each 1 Dram; make a Liniment of this, which uſe 4 Months of the latter part of the going with Child.

Of the Suffocation of Water from the Womb.

This Diſorder is ſcarce cured any other Ways than by good Diet, and an exact Re-gimen or Method of living Temperately, and of the moſt drying Victuals; abſtaining entirely from all Fruits, Raw-Meat, and a-ny kind of moiſt Proviſions: Likewiſe the Patient muſt reſolve to avoid drinking any more than neceſſity requires, and that Wa-ter with a little Wine, and a Toaſt of Bread well baked therein. The following Diet-Drink may be of ſome uſe, Take Roots of *China* half an Ounce, *Sarſaparilla* 1 Ounce, *Guajacum* 3 Drams, Sage a Pugil, boil all in Borage and Comfry Water 2 Pound; then add Powder of Coral and Crab's Claws, of each half an Ounce; Red Roſes in Pow-der 2 Drams; ſweeten with Sugar, and ſtrain it off for uſe: Of this drink 4 Spoon-fuls in the Morning, 4 more Two or Three Hours before Bed-time, abſtaining from Meat Suppers during the whole time that this Symptom laſts. Dry Bread, or that well Toaſted, with Fleſh well Roaſted, e-ſpecially that of Hare and Rabbet, are the beſt Food.

Of the Diſeaſes of Women *in* Child-bed, *&c.*

Of Pains before Labour.

THEY are to be eaſed or cured by inter-nal as well as external Means. Inter-nally may be given Powder of Saffron, *Caſſia Lignea*, Cinamon, Borax, Amber, *&c.* in Balm, Mugwort, Savine, or Birthwort Water. Take *Borax* and *Caſſia Lignea*, of each half a Scruple, Saffron 6 gr. Oil of Ci-namon 2 Drops: Mix for a Doſe. Or, Take Raſpings of Ivory 2 Drams, *Caſſia Lignea*, Cinamon, Saffron, of each 1 Scru-

ple; mix, half a Dram is a Doſe, taken twice or thrice every Hour in Cinamon and Pennyroyal Water. Externally may be apply'd Bags to the *Hypogaſtrick Region* of the *Abdomen*, made of Mallows, Motherwort, Balm, Pennyroyal, Mugwort, Roſemary, Savine, Hyſſop, Betony, Camomil Flowers, Melilot, Linſeed, Fænugreek, boil them in Wine and Water, ſqueeze the Bag firſt, and apply it when it begins to grow Cold, dip in the Liquor to heat it again, and apply as before; or a Sponge may be dip'd in this Decoction and clap'd to the Part.

Of a Profuſion of Blood.

This is to be remedied by Emplaſtick Medicines, partly Aſtringent, Acerb, Auſtere and Acid, both Internal and External; as may be obſerved in the caſe of an immoderate Flux of the Menſes; ſo like Cardiacks are to be adminiſtred, as in the Palpitation of the Heart: Externally, firſt make a Ligature upon the Arms and Hands, and Fomentations of the Aſtringent Herbs, Roots, *&c.* As Tormentil, Biſtort, Cinquefoil, Plantane, Shepherd's Purſe, Myrtleberries, Oak-leaves, Sloes, Cypreſs Nuts, Galls, boil'd in Claret or Vinegar.

In a difficult or tedious Labour.

There are many things occur either from the Weakneſs, Formation, or Situation of the Child, or from the indiſpoſition of the Mother, or from both, which may require the aſſiſtance of Medicine as well as the Hand of the Operator: If the Mother or Child be Weak, the ſtrength of both ought to be Corroborated, the Spirits Refreſhed, and Nature ſtimulated to Expulſion: By comfortable Baths, Clyſters, or Cordial Reſtorative Medicines. Take Mallows, Mugwort, *Brank Urſine*, Camomil Flowers, of each two Handfuls; white Lilly and *Althea* Roots, of each 2 Ounces; Balm and Pennyroyal, of each one Handful; make a Bath of them with New Milk and Water. Or, Take Mercury, Mugwort, of each a Handful; Camomil Flowers two Handfuls, Briony and Birthwort Roots, of each half an Ounce; Cummin Seed 1 Ounce, boil in Water, and to ſix Ounces of the ſtrain'd Liquor add Lenitive Electuary 1 Ounce, O of Amber two Drams, the Yelk of an Eg make a Clyſter. Internally give Confect *Alkermes* half a Dram, Saffron half a Scr ple, Oil of Cinamon 2 Drops; make a B lus, and give the following Draught. Ta Balm Water 1 Ounce, Pennyroyal Wat half an Ounce, Briony 6 Drams, Cra Eyes, and Pearl, of each half a Scrupl Syrup of Mugwort half an Ounce, or dr Oil of Aniſeed or Fennil 3 or 4 Drops up Loaf-Sugar, and give the Patient in a Gl of Cinamon Water, or *Malmſey* Sack: Lik wiſe 1 Scruple of the Teſticles of a Hor the Powder of the *Secundine* or Afterbirt Caſtor or Troches, of Myrrh in a Glaſs Generous Wine, or Cordial Water. Exte nally anoint the Navel and Belly with of Amber, or Camphire, or an Ointme made from Vipers; and foment the Pa with a Decoction of Savine, Motherwo Horehound, Balm, *&c.* If the Parts not ſufficiently Lubricated, they ought to Relaxed with Oils, and emollient Decoc ons, if the Paſſage be ſtrait; in like mann with Emollients, Oils of Lilies, Sweet A monds, the Nut Ben, the Fat of He Geeſe, *&c.* or the Mucilage of Linſee Quinces, Marſh-mallows, *&c.*

Of the Dead Child.

This ought to be expell'd or drawn by the Hand as ſoon as poſſible: And f by Sternutatories or Emeticks, as an in ſion of *Aſarabacca* Root, or a Dram of inward Bark of the Walnut Tree: Or the Patient take of white Hellebore Root, Powder 1 Scruple, *Euphorbium* 6 gr. Ca phire to ſnuff up the Noſe; or give ctamny or Crete, Caſtor and Borax, of e half a Scruple, Saffron 5 gr. the Teſticle a Horſe powder'd 6 gr. *Vervain* and mon Water, of each half an Ounce; for a Doſe. Take of Savine in Powde Scruples, in a Glaſs of Wine or Cor Water: To allay the Pain, and ſtrengt the Parts, after the Dead Child is delive uſe a Decoction of Roſemary, Wormwo St. *John*'s Wort, and Myrrh; then an with Oil of Myrtles, Sweet Almonds, *John*'s Wort, of each half an Ounce, *Spe Ceti* 2 Drams, Deer's Suet 1 Ounce, w

Bees-wax; enough to make it into an Ointment.

Of the Retention of the Afterbirth.

When the Midwife cannot extract the Afterbirth, but is forced to wait the effect of Medicine, let her be ſpeedy in her Application, and firſt of all make a Womb Injection which adminiſter preſently. Take Pellitory of the Wall, Mugwort, and Pennyroyal, of each a Handful; Savine half a Handful, Sage, Camomil, and Melilot, of each one Pugil; Aniſeed and Fennil, of each 1 Ounce; Bayberries 6 Drams, boil in Sheeps-head Broth 10 Ounces; in which put Syrup of Violets, and Tincture of Myrrh, of each 1 Ounce; then give the following in Internals to promote and further the Work. Take Marjoram, Pennyroyal, of each half a Handful; Camomil 1 Pugil, Parſley, and Lovage Roots, of each three Drams; boil in Wine and Water 8 Ounces, for 2 Draughts. Or, Take Caſtor and Saffron, of each half a Scruple; in a Glaſs of Wine: Or Roots of round Birthwort in Powder 2 Scruples, Myrrh half a Scruple, or ſnuff up the Powders of Nard, Savine, Mugwort, Pennyroyal, and Dictamny mix'd together.

Of the Suppreſſion of the Lochia, *or Women's Cleanſings.*

If Blood abound, and be driven to other Parts of the Body; we are to uſe Frictions in the Womb, Ligatures, Cupping, and Scarification upon the lower Parts, which if not ſufficient we muſt open the Vein in the Feet; but if this Evacuation be too fully ſuppreſs'd, it is neceſſary that we inſtitute Bleeding; not neglecting other Revulſions, and afterwards looſen the Bowels, and Aperitives are to be made uſe of, together with Externals: Let the Region of the Womb be anointed, and all the whole Belly with Oil of Sweet Almonds, Ointment of Marſh-mallows, Hen's Greeſe, to which may be added Saffron, Oil of Angelica, Spike, and Cinamon; or Bath with a Decoction of Plants, preſcribed before in the Suppreſſion of the *Menſes*. The Water and Decoction of Stone Parſley Roots, and Raiſh are very Proficuous, or the Juices of theſe drink in Wine: The following Clyſter is excellent. Take white Lilly and Marſhmallows Roots, of each half an Ounce; Pellitory and Mallow Leaves, of each one Handful; Camomil, Elder, Melilot Flowers, of each 2 Pugils; Fenugreek and Linſeed, of each half an Ounce; boil in Water, and to 8 Ounces, thereof add Oil of Dill and white Lillies, of each 1 Ounce; Ointment of Sowbread 6 Drams. A few Days after Delivery purge with Rhubarb, *Sena* and *Agarick* prepared, with the opening Roots, and *Manna:* Give the following Apozem. Take of the 5 Aperitive Roots, of each 2 Drams; Leaves of Betony, Endive, Maidenhair, of each 1 Handful; Fennil and Aniſeed, of each half a Dram; Boil in Water to a Pint, and then add half Cinamon Water, and Tincture of Saffron, of each one Ounce and a half; of the Syrup of the 5 opening Roots 4 Ounces: Give 3 or 4 Ounces of this twice a Day. Before the Fever increaſe, exhibit 1 Dram, of Troches of Myrrh in White-wine, or uſe of the following Decoction. Take of Pearl Barley, 1 Handful; Liquorice half an Ounce, *Schænanth* 1 Dram and a half, boil in a Pint of Water for 3 Doſes, and uſe an Ounce of *Schænanth* in Chicken Broth for weak Women: A too great Flux of Blood after Delivery is to be treated as the *Hæmorrhage* before ſpoken of, *&c.*

Of Afterpains.

Theſe with Gripes and Tearings in the Belly are beſt cured by Anodynes, if the Cauſe be removed: For this purpoſe give the *Species Diagalangi*, *Diacymini*, with *Diamargarite*, in a draught of Broth, with Oil of Sweet Almonds 1 Ounce, Mace, and Carui by Diſtillation, of each 2 Drops. Likewiſe Camomil Water, or the Tincture thereof; ſo Cinamon, Ginger, Mace, Cloves, Saffron, and Orange Peels are uſeful. Take *Species Diacymini*, *Diamargarite*, frig. Orange Peels, *Zedoary*, of each half a Dram; mix for a Powder, or give the following: Comfrey Roots 1 Ounce, Peach Kernels, Nutmegs, of each 2 Scruples, Amber half a Dram, Ambergreeſe half a Scruple; Take a Dram of this in White-wine, or if the Fever prevail in Broth: But the beſt Method in theſe Pains is the Opiates joyn'd with the

Volatile and Lixiviate Salts, as *Matthews's* Pill, that of *Hounds-tongue*, and *Storax*; twelve Grains whereof is a Dose which will promote the *Diaphoresis*, as well as ease Pain; but if these Gripes proceed from Bilious and Acrid Humours, they are to be cured after the same manner as Cholick Pains. External Medicines may be likewise administred: As Oil of Dill and Camomil, or the following *Sparadrap*. Take Turpentine 2 Ounces, the Anodyne Ointment 1 Ounce, common Oil of Rue 1 Ounce, Wax half an Ounce, chimical Oil of Rue, Savine, and Mint, of each 6 Drops; *Sperma Ceti* 1 Ounce, apply over the whole Belly after Delivery, *Riverius* commends *Galbanum* and *Assafœtida*, of each 1 Ounce; made into a Plaister, with 4 Grains of Musk laid in the middle.

Of the Tumour of the Womb, Belly and Feet.

If the Tumour proceed from the Womb, it must be cured by Fomentations made therein, but if from vicious Humours, a good Diet and gentle Evacuation relieves: As, Take *Sena* clean pick'd 2 Drams, Fennil Seed half a Dram, *Daucus* of *Crete* one Scruple, Salt of Tartar one Dram: Infuse in some Carminative Water all Night, and boil in the Morning. Or, Take some Pills of *Hiera* with *Agarick*, acuated with a few Grains of *Diagridium*, afterwards it will be proper to take 2 or 3 Lozenges of *Galangal* or *Diacymini*, or some other Drops of Oil of Mace or Carui in a small Glass of Wine; or take 1 Dram of the following in a Mess of Broth. Take *Galangal* and *Zedoary*, of each 1 Dram; Saffron half a Dram, Penny-royal, *Origanum*, *Scordium*, of each half a Scruple; make a Powder. For Chaps and Wrinkles of the Breasts and Belly; *Sperma Ceti* Oil of Ben, and white Lillies form'd into Ointment or Liniment, with a little white Wax, is the most excellent; those who are more delicate may perfume it with Civet, Musk, Ambergreese, or the Oil of Jessamine, which is very fragrant and useful in it self: If the Breasts are apt to extend and grow large, some Astringents may be added to this Liniment, as *Balaustians*, Mastich, Dragon's Blood, and Oil of Myrtles.

Of Fevers incident to Child-bed Women.

Those which proceed from the Spring Milk generally come about the fourth D when the Breasts begin to fill, and Cleansings flow duly: But when they natural and without Danger, they disp of their own accord about the ninth D washing away by Sweat and a large or gorous Perspiration, where a good Regim and Diet is observed: But those *Fev* which come from a Suppression; first m be cured by Blood-letting; secondly Pu ing; thirdly a Provocation of the *Loch* and fourthly by Alteratives. We n therefore safely proceed to bleeding in fu case by a Vein, but if weakness will not mit of that, Cupping and Scarification m be used upon the Legs and Thighs; and the Course be over, if the Fever increase may proceed to bleed in the Arm. As Purgation, the most Lenitive are still t most assisting in all these Cases, as *Ca Manna*, *Syrup of Roses*, *Succory*, with Rh barb, *Sena*, *&c.* Take Prunes, N°. 10 P of *Cassia* 1 Ounce, *Calabrian Manna* o Ounce and a half, or *Sena* one Dram a a half, Rhubarb 1 Scruple, Mace 6 Grain infuse in a Decoction of Prunes stoned, the Morning boil and strain, then drink but Alterative Medicines may be safe given, provided they be such as do hind the Child-bed Flux; such as Succory, B rage, Endive, Maiden-hair, Barley Wate Pomegranate Juice, *&c.* Let the Diet thin and sparing, especially for the fi Week; as Barley Water, or Chicken Bro made with Barley, and though the Fever on, Wine is not intirely to be forbid, b us'd with Discretion.

Besides these Child-bed Fevers there a such as are call'd *Concomitant*, as the *Pleu sie* and other Inflammatory ones, of whi we shall briefly remark these followi things; first in the *Pleurisie* the Vein is to cut, not in the Arm, but in the Vein u der the Knee, call'd the *Poplitis*, so th Nature may Evacuate the Blood and p cant Humours by the *Uterus*; which be done, if no further Symptoms contin a Vein in the Arm may be open'd, and there be any Apprehensions, that the cou

the Blood ſhould be drawn upwards, the
rts muſt be rubbed well below, and Cup-
g Glaſſes applied to the Legs, to make a
rulſion, and this is likewiſe to be ob-
ed in the Sore Throat, and Inflammati-
of the *Liver*. In the ſecond place, Cly-
s ought to be adminiſtred in a *Pleuriſie*,
they may recal the Motion of the Hu-
rs from the upper Parts downwards;
likewiſe free the Paſſages of the Womb,
the Blood may more eaſily be evacua-
or diſcharged from thence. Take the
bs, Mercury, Pellitory, Mallows, red
age Leaves, of each 1 Handful; Camomil
wers half a Handful, Linſeed and Fenu-
k, of each half an Ounce; boil in com-
n Water, in a Pint whereof diſſolve Le-
re Electuary 1 Ounce, *Diacatholicon*, or
e half an Ounce, Oil of Violets two
nces.

If the Fever remits not, and the time of
Cleanſings be almoſt over, there may be
entle Purge given: The other methods
cure we ſhall refer to thoſe places where
have treated of the *Pleuriſie Angina*, and
ammation of the *Liver*. Beſides thoſe
have named, there are other accidents
ending Child-bearing, as the breaking
the *Vulva* into the *Anus*; the Cure of
ich we have already taken notice of, as
ell as Ulcers of the Womb, Deſcent, In-
mation, Falling down of the *Anus*,
akings, Delirium, Epileſie, Vomiting,
anthæa, and incontinence of Urine.

Of the Diſeaſes of the Breaſts.

And firſt of the Tumours thereof, all
ings are proper which alter and cool as in
Inflammation; a Plaiſter of *Sperma Ceti*,
of Henbane, *&c.* are proper Remedies,
the Elixir of Vitriol. In the *Scyrrhus*
uſt be adminiſtred ſuch things as purifie
Blood, are Aperitive and Splenetick,
which are ſerviceable in Melancholy
ſpoſitions. In a Flatulent Tumour Oil
Camomil is good. In Tumours which
e from a Retention of Milk in the Breaſts,
e is no preſent or immediate Remedy e-
l to the Plaiſter of Frog's Spawn. We
e already treated of the *Cancer* of the
aſt, under the Title of *Cancers* in Gene-
in the ſecond Volume. We ſhall there-
fore proceed to diſtinguiſh the Diſeaſes which happen to the Breaſts, and the Operations which they require into two Parts: Namely, thoſe of the Nipples, and thoſe of *Mamma* or *Breaſts*.

The Nipple is that Eminence which jets out in the middle of the Breaſt, and in which terminate all the Lacteal Paſſages, which pour the Milk into the Child's Mouth. When the Nipple is too ſmall, the Child can ſcarce take it, and only plays with it; and when too big, its Mouth being too full with it, it cannot Suck. But to chuſe a middling and well proportion'd, it muſt be about the bigneſs of a Hazle Nut, and ſomewhat longer, to the end that the Infant holding it betwixt his Palate and Tongue may eaſily receive the Milk tho' it ſuffer never ſo little. The ſmall Channels through which this Liquor runs out cannot be too open, without letting the Milk out before the Child has occaſion to ſuck it; nor too cloſe or too ſmall, without fatiguing the Infant, by the efforts which 'tis forc'd to make to expreſs the Milk: They muſt be moderately dilated, that upon withdrawing the Child as ſoon as it has drawn the Nipple we may ſee it ſtream out in ſeveral Spouts like a Garden Watering-pot; when the Milk comes forth in this manner the Child need only Swallow, without being put to the Pain of Sucking, and theſe qualities joyn'd to ſeveral others make a good Nurſe.

In Women which have never given Suck, the Nipple is ſometimes not form'd without great difficulty: The Child cannot take it, it immediately lets it go, becauſe 'tis not yet ſufficiently advanc'd outwards, and this is what Women call not having the String yet broken, becauſe it ſeems to be retain'd as it were by a ſmall String: The manner of forming it is to cauſe the Woman to be ſuck'd by a Child of 3 or 4 Months who being ſtronger than her own juſt Born, will better mouth the Nipple; or elſe to cauſe the Nurſe to ſuck her, or one of thoſe who are uſed to form Nipples for Women in the beginning of their lying In: That done we put on a ſmall Cap made of Box, ſhap'd like a Thimble, which the Women put on their Fingers when they ſew, hollow in the middle to receive the Nipple, and pierced at the

the End and Sides to let out the Milk which may escape. This Cap, which is taken off only when the Woman gives the Child suck, is proper to form the Nipple. There is another yet more commodious, that has a Brim like that of a Hat, which hinders it hurting the Breast.

Some Children not finding Milk enough, suck the Nipple so violently, that it becomes chafed and cleft at its Basis, so much that it seems ready to separate from the Breast. This happen'd to several of the King's Nurses: Those who had not Milk enough, he bit their Nipples even till the Blood came, and as they could not resist him, they were obliged to be frequently changed. Oftentimes, after lying in, the Milk running plentifully into the Breasts curdles and hardens, which may proceed from the Woman's catching cold, or her too soon uncovering her Breast, or from putting on some Dress which presses the Part too much; in which Cases Women cannot be too cautious to keep their Breasts well covered with quilted Linen Cloths, because the Heat prevents the Milk coagulating, and opens the Ways which it ought to take to come forth to those who will not give suck.

This Accident sometimes happens to Nurses, when there is some Obstruction in the Glands of the Breast, when they have continued too long without giving suck, or when the Cold has seized them: They then say that they have the Hair, and this Indisposition throws them into a Fever for 24 Hours and more. When the Disease proceeds from Obstruction, we must make a Liniment of Oil of Sweet Almonds on the Breast, and make use of gentle anodyne and emollient Cataplasms; if from the excessive Quantity of Milk, it must be remedied by Bleeding and Diet; and if from Cold, Heat must repair the Disorder which its contrary has occasioned.

The Surgeon is obliged to endeavour to evacuate the curdled or clotted Milk which is in the Breast, without which its Continuance will not fail to cause an Abscess. There are two Ways of getting it out, insensibly or sensibly. Insensibly, that is, by Resolution, by the Use of gentle, cooling, emollient and resolutive Cataplasms. If the first do not succeed, we make them stronger with the four Sorts of Flour *Limolian Earth* decocted in *Hydromel* or M adding a little Oil of Roses. And sen by forcing out the Milk through the ple; for the accomplishing of which different Methods are proposed. One i Application of a small Cupping-glass, w Orifice is not to be larger than is nece to admit the Nipple. The other Exped is to cause the Woman to be suck'd healthful clean Woman, who having f her Mouth with Milk, spurts it out, in der to return to her sucking; and thus tinues till the Breast is drained. The t Way is for the Woman to suck her self the Help of an Instrument called a Sucki pipe, and by the *Italians Lattecole.* If a W man finds the small Cupping-glass incon nient, or that the sucking Woman puts to too much Pain, she may suck her with this Glass Instrument, the large of which is to be applied to and cover Nipple, the Woman keeping in her Mo the other End. By this Means she will put to less Pain, but must continue till Breast is wholly exhausted.

If notwithstanding all these Expedie the Milk continues in the Breast, it w certainly grow to an Abscess, to the wh 'tis the more apt, by reason that a very li Alteration is sufficient to turn it to *Pus.* this Case, we are to open the Breast wit Lancet as soon as we perceive any Fluct tion, in order to prevent the *Pus* occasion any Disorder in this very sensible and ten Part. 'Tis one of the old Wives Errors believe that Steel Instruments are not to used in Distempers in Women's Breasts, a we find Women obstinately persist in th Refusal to suffer them, when we are to le them to be ruled by their own Caprice, which they often pay very dear; for th they suffer a longer Time, in Expectat that the *Pus* should eat through the Skin make its way out; and so instead of o Hole made with the Lancet, that sometim breaks out into five or six, which miserab lacerate the Breasts, and then they repent their Obstinacy.

But when a Woman submits her self her Surgeon, he is to take a Lancet wra in a narrow Bit of Linen, which leaves t Blade no further discover'd than is neces

make the Inciſion, which muſt be but ice as long as that in Bleeding, in order evacuate the Matter only. We uſe no ent in this Sort of Abſceſſes: No more is ceſſary than a Plaiſter cut in the Shape of *Malteſe Croſs*, which is taken off as there freſh Matter to come out. For my Part, ter the Orifice is made, I always uſe ſuch Plaiſter, which I compoſe of the *Unguentum ſacrum* or divine Ointment, ſpread on a Piece of Leather, with which I cover the whole Breaſt, and have found it to ſucceed very well. The Patient dreſſes her ſelf, taking off the Plaiſter three or four times a day to dry it, and warming it again when ſhe puts it on. Three or four Plaiſters renew'd from time to time mollify the Hardneſs, and proceed on to a perfect Cure.

Of the Diſeaſes of Children, and their Cures. From Michaelis, Harris de Morbis Infantum, &c.

Of milky Scabs, and running ſore Heads.

THESE muſt not be ſuddenly ſtop'd in Infants, becauſe they preſerve from the *Epilepſy*. If the Child ſuck, the Nurſe or Mother muſt be purged with Pills of Fumitory and the Catholick Extract taken in Whey; then waſh the Child's Head with Decoction of Mallows, Borage and Barley. This being done, lay on warm Cabbage Leaves anointed with Butter, or elſe Ivy Leaves; alſo thoſe of Orach or Marſh-mallow Roots boiled in Boy's Urine. Topicals are allowed, as the Juice of Fumitory, Scabious, Elecampane, Tobacco, Litharge, Oil of Nuts, Hogs Greaſe. *Foreſtus* hath an infallible Remedy for Boys, *&c.* Take, the Yolks of Eggs roaſted hard, *N°* 16. Myrrh, two Drams; Root of Cuckoo-pint, half a Dram; Black Hellebore, one Scruple; fry them in an Iron Frying-pan, without Flame, until they froth; then preſs out the Oil, and fry them ſo often till they will froth no more, caſt away the Dregs, and keep the Oil for Uſe. In thoſe that are older, it is cured by Digeſters, and chiefly by Remedies that evacuate Flegm and Melancholy: Till theſe be often uſed, Topicals are not proper; for they are only to ſoften the Cruſts, and then muſt be applied the Juice or Decoction of Fumitory, ſharp Dock, Celandine, Ivy Leaves, Scabious, and Bean Flower. *Galen* only uſed burnt Paper ſoak'd in Vinegar, and anointed the Part affected, and ſo cured many. *Foreſtus* gives this following for a Secret: Take, Salt Butter, Hog's Greaſe, of each one Ounce; Brimſtone, half an Ounce; Quickſilver killed with Spittle, one Dram; and Vitriol, one Scruple: The Butter, Hog's Greaſe and Brimſtone, muſt be melted apart; then add the reſt. Laſtly, it is cured as the *Small-Pox*: Balſam of *Peru* and Turpentine boiled in Juice or Water of Tobacco is good to foment with; but to perfect the Cure, nothing exceeds Antimony Diaphoretick mix'd with burnt Hartſhorn; to which add Powder of humane Skulls and Crab's Eyes; give a little of this Powder twice or thrice a day in Syrup or Conſerve of Elecampane. The *Syriaſis*, or Inflammation of the Brain and Membranes thereof, is cured with Sugar of Lead in Lime Flower Water, thoſe of Elder Flowers, or Nightſhade.

Of the Epilepſy in Infants.

If this ariſe from the Conſent of the Parts, then Specificks are always to be mix'd with the Epilepticks: If from Fear, the *Smaragdus* may be given, becauſe it anſwers two Intentions: If this proceed from bad Milk, a gentle Vomit is beſt, ſuch as may be procured by Oil of Sweet Almonds freſh drawn, or Oil of Ben: If from Worms, then ſuch Medicines are to be adminiſter'd as deſtroy Worms, as well as ſuch as are ſpecifical for the *Epilepſy*: Amongſt the Internals, Antimonial and Mercurial Medicines are the beſt. If from the *Small-Pox*, Epilepticks are to be made choice of, as the

Epi-

Epileptick Powder of *Langius*; Cephalicks and *Bezoardicks*: If this diſorder come from the Brain, uſe the Magiſtery of Elks Claws, Tincture of the *Smaragdus*, Spirit of Urine, ſhaving of Human Scull, Pæony Flowers, Balſam of Amber, *&c.* Take of the Epileptick Magiſtery 1 Dram, *Bezoar Solis* half a Scruple; drink this in an Ounce of Pæony Water Compound, or 30 Drops of Tincture of Pæony, and the Epileptick Spirit of Vitriol mix'd together. Or, Take Lime Flower Water, Lilly of the Valley, and black Cherry Water, of each 1 Ounce. The Epileptick Water of *Langius* half an Ounce, Human Scull, *Smaragdus* prepared, of each one Scruple; ſweeten with *Manus Chriſti* pearled *qſ.* make a Potion.

Clyſters may be given of Lime Flowers, Lillies of the Valley, of each 3 Pugils: Pæony Roots half an Ounce, *Sena* 2 Drams, boil in common Water, and in 3 or 4 Ounces of the ſtrained Liquor, diſſolve 2 or 3 Drams of *Hiera Picra*, Extract of Caſtor 4 or 5 gr. Or, Take Roots of Pæony, round Birthwort, of each half an Ounce; Rue a Handful, Agarick cut in Pieces 1 Dram, boil in Water as before, and add a Dram or Two of *Hiera Picra*, with Agarick; there may be added to theſe Clyſters ſome Drops of Oil of Amber or Rue. Take Balſam of Amber, Oil of Rue, of each half a Dram; the Fat of the Caſtor or Beaver 2 Scruples, mix for a Balſam. Or, Take white Amber and Maſtich, of each 1 Dram and a half; *Galbanum*, *Opoponax*, of each 1 Scruple; the Glew or Gum of the Oak 2 Drams, Pæony Seeds half a Dram, *Cadamum* two Drams, Ambergreeſe and Musk, of each 3 gr. Oil of Nuts, make a Plaiſter, which is to be ſpread upon Leather, in form of a half Moon, then ſtrew upon it Powder of Cubebs, and apply to the Head, ſo that both Extremities of the Head may be covered.

Of Fearfulneſs and Starting in Children.

Where Infants are ſubject to ſtart in their Sleep; give the Powder of Pæony, Elks Claws, *&c.* in Treacle, and externally apply *Crato*'s Stomachick Oil; that of Nutmegs, and if this Diſorder come from bad Milk or Worms, or the Epileſie, lay upon the Pulſe *Mechoacaan* with the *Facula P*[illegible] *nia* mix'd, or upon the Stomach lay the P[illegible] ſter of Bread Cruſt and *Cardamum*, mala[illegible] with Oil of Maſtich, and Balſam of *P*[illegible] or make a Balſam of expreſs'd Oil of Ma[illegible] and Nutmegs, of each 1 Dram, Oil of [illegible] niſeed half a Scruple, with this anoint [illegible] Stomach of the Infant; or adminiſter a C[illegible] ſter of Pæony Roots, Lime Flowers, a[illegible] Aniſeed boil'd in a little Water, and ſwe[illegible] ned with Syrup of Pæony, and 6 Drops Oil of Nutmegs by Diſtillation.

Of too much Waking, or want of Sleep.

Here the Phyſician ought to be Cauti[illegible] leaſt he injure the Infant with the too f[illegible] uſe of Opiates, or Narcoticks: Externa[illegible] uſe to rub the Temples with Mother's M[illegible] and a little Saffron, Oil of Nutmegs by [illegible] preſſion, and Ointment of Populeon: [illegible] ternally may be given the comforting A[illegible] dyne Powder, or white Poppy Heads bo[illegible] in Breaſt Milk, and ſweeten'd with Sy[illegible] of Corn Poppies, or the Head may be [illegible] mented with an Infuſion of white Pop[illegible] Seeds in Spirit of Wine Camphorated, a[illegible] Breaſt Milk, to which drop 6 Drops of [illegible] of Dill, and as much of Nutmegs: Or g[illegible] the Child 2 Drams of Syrup of *Diacod*[illegible] in ſome *Hypnotick* Water.

Of the Running or Moiſture of the Ears.

Externally may be apply'd the Chym[illegible] Oil of Wormwood, Spirit of Urine tha[illegible] not too Acrid, by being often rectified, [illegible] of bitter Almonds, freſh Urine of a Ch[illegible] and ſuch like, but above all the Spirit [illegible] Millepedes and thoſe of Ants or Bees dro[illegible] in Oil of Ben, and put into the Ear w[illegible] Wool or Cotton.

Of the breeding of Teeth.

The White Scours incident to Child[illegible] on this occaſion are not to be prefer[illegible] ſtop'd, leaſt the Epilepſie or Convulſi[illegible] prevail. The Swell'd or Tumefied Gu[illegible] muſt be anointed with the Blood o[illegible] Cock's Comb, the Fat of a Hen, Oil of [illegible] lies, Camomil, Ointment of *Althea*, and [illegible]

like. Take Fleawort Seed, Linſeed, and Marſh-mallow Seed, with Roſe Water, extract a Dram and Half, inſtead of Julep of Roſes add Sugar Penids, and make it of the conſiſtence of a Liniment; what is neceſſary on this ſubject hath been touch'd before in the Firſt and Second Volumes.

Of the Cough.

If the Matter deſcend from the Head and form a *Catarrh*, the beſt Remedy is freſh *Sperma Ceti*, given by it ſelf. Likewiſe Amber, the *Fæcula* of *Arum*, Orrice, Pæony and Human Scull prepared. Take Oil of Sweet Almonds half an Ounce, Sugar Penids *qſ.* to make a Linctus or Pap of it, add the *Species Diatragacanth* frigid half a Dram, *Sperma Ceti* recent 1 Scruple, apply a Cere-cloth to the Stomach made of *Tacamahaca* malax'd with Oil of Maſtich, and Tincture of *Benjamin*. If the Cough proceed from a mutinous Matter the Powder of *Mechoacan*, with *Fæcula Aronis* may be given; in a dry Cough the *Species Diarragac.* and *Diapenid*: Externally anoint with the Pectoral Ointment; internally give Hyſſop and Scabious Water, of each 1 Ounce, Syrup of Elecampane, and Oil of Sweet Almonds, of each half an Ounce; give a Spoonful now and then. Where the Matter is Viſcid and Tough; Take white *Mechoacon* 1 Dram and a half, *Arum* in Powder 2 Scruples, Human Scull prepared half a Dram, *Species Diarees* one Scruple; mix and give half a Dram of this once a Day in Breaſt Milk. Or, Take Oil of Sweet Almonds 1 Ounce, *Manna* 6 Drams, Extract of Liquorice two Scruples, *Lac ſulphuris* 1 Scruple, with Scabious or Hyſſop Water; make a Lambative to be given in a Tea-ſpoon: If occaſion be add 3 or 4 Drops of Oil of Aniſeed. Take Confection of *Alkermes*, or Juice thereof, 1 Scruple, Camphire 7 gr. Oil of Fennil or Aniſeed 2 Drops, give in a Spoonful of Syrup of Violets. Take the tops of Dill, Camomil, and Elder Flowers, of each one Handful; Fennil Seed 2 Drams; boil them in Calves or Sheepspluck Broth; to ſix Ounces of which put Honey of Roſes 2 Drams, and make a Clyſter for a Child of 3 Mouths old to that of 12 or 18 Months.

Of Puking or Vomiting.

This is not to be ſuddenly check'd, but ſome times promoted, according to the Nature and Exigence of the Caſe which is done by giving Oil of Sweet Almonds in Plenty; or for Revulſion ſake by adminiſtring of Clyſters. Likewiſe it is ſerviceable to uſe the *Emplaſtrum de Cruſta Panis*, with Oil of Maſtich, and a Cataplaſm or Pultiſe of the ſharpeſt Leven of Mint, red Roſe, Frankincenſe and Nutmegs in Powder prepared, with Vinegar of Roſes, or other appropriated Herbs, with Oil of Maſtick, Nutmegs, *&c.* Internally give Crab's Eyes, Crab's Claws, Pearl Coral, *&c.* prepared with Vinegar.

Of the Gripes.

In this Diſtemper all Specifick Clyſters are proper from Carminatives, or the Flowers of Camomil, Bay-leaves, Mint, Southernwood, and Bay-berries. Take the Species for the Carminative Decoction half a Handful, Bay-berries 2 Scruples; boil in Water to two, 3, or 4 Ounces, of which add the Electuary of Bay-berries 3 Drams, Oil of Rue, and Cummin of each 4 Drops. If you are apprehenſive of the *Epilepſie*, add Oil of Rue in all Clyſters and Externals. Take of any Carminative Water 1 Ounce, Syrup of Orange Peels 6 Drams, Oil of Cinamon 2 Drops; make a Plaiſter of Bayberries, with Oil of Dill and Camomil, in all Gripes and Wringings of the Belly Aniſeed groſsly bruiſed and given, not only expels Wind, but looſens the Belly. If the Gripes are very obſtinate make a Bath of Camomil Flowers, tops of Dill, Rue, and Bay-leaves, and at the ſame time give the Child about the ſize of a Pea of Venice-Treacle.

Of the Cardiack Paſſion, or Heart-burn.

In Inflations of the *Hypochondria* Aniſeed is very prevalent, Roots of Angelica and *Species Diacymini.* Take powder of Orrice Root and Aniſeed, of each 1 Scruple; *Fæcula Peoniæ* half a Scruple, Syrup of O-

range Peels 6 Drams; mix for 2 Draughts to be taken upon the Paroxyſm or Fit: So anoint the Breaſt and pit of the Stomach with the *Cardiack* Ointment 1 Ounce, diſtill'd Oil of Angelica, Dill and Camomil, of each half a Scruple.

Of Coſtiveneſs.

Give in this caſe, at firſt, *Caſſia* freſh extracted, *Manna* Pulp'd, Raiſins and Currans, Prunes, Pulp of Apples, but if theſe will none of them move, *Mechoacan* and *Agarick* may be admitted, or ſuppoſitories made thereof, and the Parts anointed with Oil of *Diacolocynthidos*, or rotten Apples made into ſuppoſitories with Gooſe Dung, *&c.* Gooſe and Hen's Greeſe put upon the Navel with a Walnut will looſen the Belly; ſo Ointment of Sow-bread and *Althea*, eſpecially if mix'd with an Oxes Gall, for Clyſters uſe the Emollient Decoction with Linſeed or Rape Oil.

Of the White Scoure in Children.

Give abſterging Clyſters of *Scordium*, and Syrup of Roſes Solutive: Amongſt the Aſtringents to the moſt particular are Rhubarb roaſted before the Fire, red Coral, Juice of Citrons, Ivory, Hartſhorn, Nutmegs, Maſtick, Cinamon Water, Syrup of Quinces, Coral, and Maſtich; externally uſed aré Oil of Quinces, Myrtles, the Counteſſes Ointment. Take Magiſtery of Coral, with Juice of Citron 1 Ounce, *Crollius Stiptick* Powder divide into 3 Doſes, and give in the white Hartſhorn Drink, made with Syrup of Orange Peels. Take burnt Hartshorn, Magiſtery of Coral, or Coral prepared 1 Dram, Pomegranate Powder and Maſtich, of each 1 Scruple; mix and take as before. Take Oil of Maſtich and Myrtles, of each 1 Dram; Nutmegs by Expreſſion 2 Drams, for a Liniment. Or, Take the Counteſſes Ointment 3 Drams, Oil of Mace by Expreſſion 1 Dram, Oil of Myrtles *qſ.* Or, Take the *Emplaſtrum Diaphœnicum qſ.* Malax with Oil of Maſtich, apply this to the Belly.

Of Worms.

The Signs, The Mouth is full of Spitt the Sleep is troubleſome or diſturbed, th ſcratch their Noſes, chew often, and ha a dry Cough: Infants cannot take very b ter Things: They are cured with the Cor line Powder, Wormſeed, Roots of wh Dittany, but above all with Calomel: for Example, Take Calomel 10 or 12 Jalap or white *Mechoacan* 6 gr. give in t Pap of an Apple, or a Fig, or a Raiſ for 8 or 10 Days together. Epileptick M dicines are often proper to be given alo with ſuch as kill Worms. If there be a *ver* we muſt give cooling Things, as Ju of Lemons, Pomegranates, Oranges, Har horn, Bezoar, *Lapis Prunella*, and Clyſt of *Sal Prunelle* boiled in Water, and a l tle Cryſtal Mineral with Syrup of Viole apply bitter things outwardly to the S mach and Navel, as Aloes, Myrrh, Oil Wormwood; *Heurnius* commends Syrup Succory, with Rhubarb half an Ounce, the Hartſhorn Drink, given for a Doſe very other Day. Broad Worms requ ſtronger Medicaments, as Walnuts, F Roots, which powder and give half a Dr to an Infant: Sweet things may be given Clyſters to allure the Worms downwar as Syrup of Peach-flowers, Agarick, The Bots are cured by Suppoſitories of T peth with Rhubarb, Aloes and the li or according to *Aetius* a Suppoſitory ma of old Salt Beef, the Fat being taken For the *Hernia* or Rupture in Childr with the Prominence or Strutting of Navel I refer you to what hath been alr dy ſaid on that Head, for the Inflammat of the Navel you may uſe Oil of Ro with Wax, the Plaiſter of Frog Spawn, that of *Diapompholagos*.

Of the Stone in the Bladder.

Incontinence of Urine, of Galling Chafing, and waſting in Children: G the Nephritick Magiſtery half a Dram, Milk or Water Pap: Or, Take Crab's E and Amber prepared, the Nephritick Sto

of each half a Dram, give a Scruple at a time, drinking after a Spoonful of the following. Take Reſtharrow, Alum Water, and that of Saxifrage, of each 1 Ounce; Syrup of Marſhmallows, and the Juice of Strawberries, of each 5 Drams. For a Speſifick Clyſter; Take Mallows, Pellitory, Saxifrage, Golden Rod, of each 1 Handful; Roots of *Althea* and Parſley, of each 2 Ounces; boil 'em in Water of Rhadiſh a Pint, Take ſix Ounces hereof and add thereto, of the Juice of Onions, and Oil of Scorpions, of each 1 Ounce; at the ſame time anoint the *Perineum* with a Liniment made of Fox or Human Greeſe 3 Drams, Oil of Scorpions 10 Drops, a little Bee's Wax. *For Incontinence of Urine*; Take Maſtich, the Calcined Powder of a Hedge-hog, or Urchin, of each 1 Scruple; Take at Bed-time in Syrup of Cinamon 2 Drams, or a Spoonful. Or, Take of the Species of Plantane, *Martis Mynſicht*, of the burnt Urchin, of each a Dram. Or, Take the inner Coats of the Hens Craw calcined to Powder 1 Dram, *Crocus Martis Aſtringens* 1 Scruple, mix as before: Anoint the Parts with *Ung. Comitiſſæ* 2 Drams, Oil of Maſtich 1 Dram. For Chafing betwixt the Legs, or in the Groin, uſe *Lapis Calaminaris* in Powder finely grown with white Lead, and Plantane Water: Or the Ointment *Diapompholigos*, with Ceruſſe. If the waſting or falling away of Infants proceed from Worms the Spine of the Back muſt be anointed with Honey, and the Child put into a warm Bath of Southernwood, Balm, Hyſſop, *&c.* ſo the Worms will come forth of the Body, but if it ariſe from bad Milk, the Nurſe muſt be changed, or the Blood purified in order to correct and alter the Milk for the better Reſtoration of the Health of the Infant.

Of the Fevers in Children.

They proceed either from bad Milk, Worms, or breeding of Teeth. The Nurſe or Mother muſt be purged with *Diacatholicon*, Lenitive Electuary, Syrup of Roſes, *&c.* give the Infants Alteratives, as the Juice and Syrup of Violets, Lemons, Endive, Succory: Anoint the Spine or Backbone with the Mucilage of Fleawort Seed, Oil of Violets, and Bee's Wax: Lay an Aſtringent of *Laudanum*, *Tacamahaca*, of each 1 Dram and a half; Oil of Quinces, and Balſam of *Peru*, of each half a Scruple; to the Stomach. Take Conſerve of Borage Flowers 1 Ounce, *Pulp* of *Caſſia* 6 Drams, Mucilage of Fleawort Seed half an Ounce, the Doſe is a Dram or two, Syrup of Succory with Rhubarb, and *Caſſia* may be given.

Of the Medico-Chirurgical *Obſervations about the Infirmities of* Women.

Obſervation I. *Of a ſtrange Rupture of the* Uterus.

Written to the Famous and Experienced Job van Meeckren, *Chirurgeon in Ordinary to the City of* Amſterdam, *the* Hoſpital, *and the Noble College of the* Admiralty.

Wherein ſeveral ſuch-like remarkable Accidents about the Uterus, *and other odd Caſes of happy Cures are Related.*

SIR,

WHAT *Hippocrates* ſaith of the *moſt Dangerous Diſeaſes*, that they *require the moſt difficult Remedies*, may be juſtly applied to that dangerous Birth call'd *Cæſarean*; though, if good Authors may be Credited, many have had good Succeſs therein: Of which not a few differing Examples are Recorded by the learned *Franciſcus Rouſſetus*, in his Book *de Uſterotomotokia*, and by ſome others. But in theſe our times very little is ſpoken of this Operation, for ſeveral Reaſons.

1. Becauſe of the ſlender Knowledge that moſt Midwives have, not only of this Operation, but alſo of others. For if they knew or conſidered, how neceſſary, in a well-conſtituted State, this Operation and Extraction of the *Fœtus* (the Mother being Dead before) is, and that *Civilians* account it Homicide, to bury the dead Woman big with Child, before the Child be cut out of her Belly; they would be more concerned for it. *Juriſconſulti eum necis damnant, qui gravidam ſepelierit, non prius extracto fœtu, quod ſpes animantis cum gravida periiſſe videatur*; lib. 2. *De mortuo inferendo, & ſepulchro ædificando.* So that, when it happens that a Woman great with Child cannot be Delivered, there ſhould always a Man-midwife be at Hand, to ſave the Fruit and to perform this noble Operation, in caſe the Mother died before ſhe be delivered. *Valerius Maximus*, *l.* 1. *cap. ult.* Relates, that *Gorgias* coming into the World after his Mother's Deceaſe, did by his unexpected Cry ſtop thoſe that carried the Corps, and ſo was carried out before he was Born. Se hereof *Fabritius Hildanus* in his Anſwer t *Michael Dorengius*, Chirurgeon of *Breſlaw.*

2. Becauſe it is a difficult and troubleſome Operation, eſpecially for ſuch as are not experienced in Anatomy, and conſequently know not what the *Cæſarean Section* means. Which is nothing but an Extraction of the *Fœtus* out of the Womb of a Woman, that cannot be delivered but by the Inciſion of her Belly and Womb, ſo to be made as to ſave, if poſſible, both Mother and Child, and that without impairing Fruitfulneſs; of which laſt ſee, among others, *Paulus Dirlewang*, who perform'd the *Cæſarean Section* upon a Woman of *Vienna* called *Margareta*, ſo that a Year after her Cure ſhe was with Child again: Who time of Travel approaching, and ſhe finding her ſelf unable again to be Delivered ſent alſo the ſecond time for the ſaid Maſter, who though he found the Woman v

y Weak, yet perceiving the Child Strong nd Vigorous, adviſed again to uſe the Knife as formerly, which the Woman, who ould not be ſaved without it, conſented nto. But her Mother and others diſſwaing her from it, and exhorting her to truſt ther to Almighty God for her Delivery an to undergo again ſo hazardous an Opeation, ſhe complied with them. But ſeeng that this Woman had carried her forer Fruit *Four* Years in her Belly, whence was at laſt cut out by Piece-meal, whereon ſhe was happily cured; why might ot ſhe have been ſaved this ſecond Time, the Child, which was ſtrong and luſty d been cut out betimes.

3. Some are of Opinion, that enough hath en written of this Operation, and that othing can be ſaid but what hath been alady ſaid by others. But I am of a contra- Opinion, that whatſoever hath been ritten of *Phyſick* and *Chirurgery*, is not to compared to what yet may be written ereof.

As for Example, *Firſt*, concerning the tting ſuch an *Haremouth*, in which the up- Jaw-bone together with th Palat of the outh is Cloven, and the Lips are a full h gaping aſunder: How much doth ch an Operation differ from the Inſtruons left us by famous Writers?

Secondly, As to Women in Travel, whoſe d Fruit is to be taken from them, I obve, that the chief Authors that have writ- of it, have been very little verſed in t Operation; nor that the Inſtrument, led the *Hook*, is very convenient to pull t a Child's Head left ſticking in the Mo- 's Belly: And what ſmall uſe, if any all, there is of the *Speculum Matricis*, in s caſe, I leave to you to judge.

Thirdly, As to the taking out of the *Ute*- it ſelf, of which many Famous Authors e written ſo much, I have largely treatthereof in a particular Obſervation, ence you will eaſily underſtand my meanin this Point.

Fourthly, At this very time we underd both by Letters, and from Patients, ething very conſiderable touching a new nvance of *cutting the Stone*, practiſed in e at *Bourdeaux* by a Lithotomiſt called *Raous de Chaiſtres*, now dwelling at *Niſmes*, uſed both upon Old and Young, and that after a quite other manner than hath been practiſed hitherto. For, after that the Patient hath been ſounded and felt by the Artiſt after his own Way, without any bodies being preſent, he then together with the Patient walks for half an Hour in his Chamber, and then puts him in his Servant's Lap, who holds the Patients Leg without tying him, and the Maſter uſeth no other Inſtrument but a little crooked Knife, and no Bands; nor doth he uſe any force in preſſing the Belly, in lifting it up, or the like, thereby to get the Stone between his Fingers. 'Tis alſo done with leſs trouble and danger, without as much as obſerving the ſeaſon of the Year, the Temperament of the Patient or his Age. He only thruſts two Fingers into his Fundament, ſo to get the Stone; which having compaſſed with little Pain, he conveys it with his Fingers to the *Os iſchium* as far as he can: And then a little higher making an Inciſion with his little crooked Knife, of the uſual bigneſs, but ſomewhat higher, and obliquely, beginning from the ſide of the ſaid *Os iſchium*, and ſo continuing to the *Perineum*; which Inciſion or Opening is more (in that Place) according to the Grain of the Fibres; as will be found, if viewed Attentively. Now, a ſmall Opening made according to the Grain of the Fibres, will yield much more, and can by Laceration be ſomewhat widened, if it hath been made too little; (for the Wound, that is to be made in cutting the Stone, is better a little too ſmall than too great;) and by this means with his Fingers he eaſily draws out the Stone, without the uſe of any other Inſtrument; and after having cleanſed the Wound, he conveys and thruſts back the Bladder to its Place, whence it had been removed; preventing alſo the droppings of Urine, by dreſſing the Patient with an ordinary Band, who in ſeven or eight Days is perfectly Cured. I have alſo read a printed Letter, Entituled, *La nouvelle maniere de tailler la Pierre*, i. e. *The new manner of cutting the Stone*, wherein 'tis affirm'd, that then this Maſter had already cut, after this Way, above 50 Perſons, of 20, 30, 40, 50 and 60 years of Age, with ſo

good

good Succeſs, that not one of them all had died, yea that very few or none of them had had ſo much as a Fever. Thus you ſee, that Art is more and more improv'd by continual Diſcoveries, for which we ought to praiſe Almighty God, vouchſafing ſuch and the like new Remedies to the benefit of Mankind.

The Hiſtorical Obſervation, Sir, which I have choſen to dedicate unto you, is of the *Rupture of the Womb*, in ſuch a Perſon, out of whoſe Belly the *Fœtus* was cut, after ſhe was Dead. The Hiſtory whereof is this: In the Year 1658, the 24th of *December*, I was ſent for in the Morning about Eight of the Clock, to come into the *Laurel-ſtreet*, to give my Advice and Aſſiſtance to Four of the Town-Midwives. Theſe were diſputing amongſt themſelves, whether the Fruit of this Woman in Travel lay right or not; which diſpute was the more Eager, becauſe the poor Patient had then been already *Four* Days in Labour, with great Throws and Pangs, highly complaining of grievous Pains in her left Side, about and above the Navel. The Midwives differ'd very much amongſt themſelves, touching the Condition and Poſture of the Child. One of them was of Opinion, that it was turn'd Right; another of them, that it was turn'd the wrong Way, and was come with its Feet Foremoſt; a third would have it, that it lay with its Fundament before the Paſſage, and that ſhe had had her Finger in the Fundament; and the fourth ſaid, ſhe had left the Child's Hands. So that, after long inquiry, I did not think it ſtrange that they were thus Quarelling, and ſo wide from one another in their Sentiments; whence I collected, that it muſt needs be a difficult and dangerous Caſe; finding, they could not give me any good Information concerning the Fruit, but inveighed one againſt another with keen Reproaches of Ignorance and Miſtake: Which I interrupted by telling them, that theſe Contentions and Invectives were not the means of helping this poor Woman, much leſs the hatred which they ſeem'd to bear one another. Mean time I thought it moſt Adviſable, to ſearch into the matter my ſelf, thereby to be enabled to prove by Reaſons (of which they alledged none) which of all the four was in the Right, a which not. And this being a dangero Work, I began with making ſearch of t State of the Child, by laying my Ha upon the Navel of the Belly, and deſi the Woman to hold in her Breath, there to ſtraighten the Fruit, and conſequently put it into a ſtronger Motion. At whi time the poor Woman cried and wept b terly, and complain'd exceedingly of into rable Pains in her Belly and Loins, yet m of all above her Navel, about the low part of her Stomach: The other parts of Body I found to be very Well, but not in a Woman in Travel; for the *Intern Uteri Oſculum* was yet very cloſe, nothi but a little Moiſture ouzing out; but as a Child there was no appearance of any fu thing to be perceived. And this poor W man having had more Children, ſhe ſtr to bring forth this Child with all Might; to which ſhe was encouraged by Midwives aforeſaid. But I, having m careful ſearch, and weighed all things, f bid the Patient to ſtrive ſo Hard, for much as the Child, in my Opinion, w yet in the Membrane call'd *Chorion*, wh is the moſt outward Coat wrapped ab the Fruit; and that thoſe Midwives did miſtake the State and Condition of Child, eſpecially ſhe that affirm'd, ſhe had her Finger in the Child's Fundame and I added, that, whereas they all jud thoſe Pains to be throws for bringing fo I was of a contrary Judgment, *viz.* that thoſe Pains no Child would be brought to the World; but that, if this Wo ſhould be delivered of a Child, there m be made an Opening in her Belly, ſhew them the Place where; which Operatio ſaid, had been often performed, witneſs veral excellent Writers, who call it the *ſarean Inciſion.* To which the Midwives ſwered, that they had never heard of ſu dreadful Operation. However, the Woman, who was *French* by Nation, lo upon me with ſome Chearfulneſs, an treated me, that I would uſe this Opera upon her, throwing off at the ſame time Covering, and preſenting her Belly to Knife. Which, when I ſaw, I ſaid to in a kind Tone; Dear Friend, you

that these Women have never heard of this Operation; besides, 'tis not the Custom in this Country, to practise so extraordinary an Operation without the Consent of the Lords the Burgomasters; after the same manner, that the Operations in cutting the Stone are wont to do: And I should very much be blam'd and reproached, if this unusual and difficult Operation should fail of good Success; which God forbid.

Notwithstanding which, this poor Woman made instance, that I would put my Advice in Execution; for, without it, she said, both she and her Child would be lost: Assuring me at the same time, that she had formerly been present at such an Operation in *Paris*, and therefore intreated me to make use of the same upon her. Whereupon I encouraged her, and said, I would consult with some of the best Physicians in Town, and desire their Assistance and Direction in this Case. Which having been done by me, they disswaded me from it, because of the great Consequence, especially the Woman being very Weak. Returning therefore to her, I only prescribed her an Emollient Clyster, and exhorted her to some Patience. The Clyster was this.

℞. *Fol. Bismalvæ, m.* 1 ʃ8.
Artemisiæ,
Matricariæ.
Pulegii, aa m ʃ8.
Flor. Camomilt.
Melilot, aa pugil. iij.
Sem. anisi, fœnic. aa ʒij. *Fiat s. a. decoctio; colaturæ sumantur* ʒvij. *in quibus dissolve Electuar. sequens.*
Diacath. Lenitiv. ana ʒj.
Ol. mucaginum ʒjʃ8.
Misce, fiat clyster.

And to renew her strength, as also to ease her Pains, I prescribed this Potion following to take now and then a Spoonful of

℞. *Aq. fœniculi* ʒiiij.
Artemisia ʒij.
Cinnamomi ʒj.
Conf. Hyacinthorum. ʒij.
Laud. opiat. gr. j.
Croci. ʒʃ8. *Misce, fiat potio.*

Coming to her again about two a Clock in the Afternoon, I found the Patient yet Weaker, and in appearance near Death. Which made me give order to the Midwives, that as soon as they perceived her senses fail her, and that she was agonising, they should forthwith give me notice thereof, seeing that the Child did yet strongly stir in the Mother's Belly; and, if they spoke in good Time, there was Hope to save the Child, and so to acquit our selves of our Duty. There passed not full four Hours after this, but I received News that the Woman was Dying; which made me call, in my Way, upon some Physicians I knew, *viz.* the learned *de Vick*, *Piso*, *Sylvius*, and *Walterus*; of whom *Francis de Vick* and *Piso* promised to follow us.

Being come there, we found the poor Woman Dead, having a Key betwixt her Teeth to keep her Mouth open; which is practised amongst the Vulgar, who thereby think for a while to keep the Child a Live, as they also thrust their Fingers into the *internum uteri osculum*, to keep *that* likewise open, for the Child's Respiration. Now, when I laid my Hand upon this Woman's Belly, and perceived no Motion, I leap'd upon the Bed, and gave Dr. *Sylvius* my Anatomical Knife to open the Belly with all speed at the place where I formerly had found the greatest Motion, to wit, on the left Side, where the *Fœtus* lay, hoping to find it yet alive: But we failed of our Hope, for it was Dead, though in all appearance it had been so but a very little while, seeing the poor thing had its Lips yet cover'd with Fome, and very Fresh, so that 'twas evident, it was but very lately Expired.

Examining the Posture of the Child, we found, that it lay in the midst of the Belly, between the Guts, together with its Afterbirth in part so firmly fastned to the *Colon*, that we could not separate it from thence without Laceration. By the other Parts it was yet fast to the *Uterus*, an Inch Broad; which, in my judgment, was the only thing that enabled the Child to live two or three Days in the Mother's Belly, *without* the Womb; and I looked upon it as a wonderful Providence of Nature, that the Afterbirth, although it was by the shooting out

of

of the Fruit removed in Part, had forthwith ſo cloſely faſten'd and united it ſelf to the ſaid Gut, that it could perform its Function, it being yet in part faſt to the *Uterus*.

Firſt, We found the Child lying between the Guts.

Secondly, The After-birth was in part faſt to the Guts.

Thirdly, The ſame as to its other Part was yet faſt to the Womb.

Fourthly, We found a great Opening or Laceration in the Womb.

Fifthly, We met with ſome black coagulated Blood in the Belly.

And here we much wonder, not only how this poor Woman came by this Miſchief, but alſo how ſhe could endure ſo great Pain, as muſt needs accompany it.

As to the *Cauſe* of this Evil, I judge not that to be Internal but External; *viz.* ſome Fall, or Blow, or Knock, or ſome outward Accident wounding that Part, whence ſtore of extravaſated Blood was diffuſed between the Membranes thereof, whereby the Womb was then diſenabled to endure any throws in the Labour, and the ſtrong and ſtriving Motion of the Child, whoſe Hand or Hands broke through, and then the Water breaking alſo, the Child ſhot whole into the Cavity of the Belly, and ſo cauſed its own and the Mother's Death.

Beſides, there is this reaſon which made me believe the Cauſe to have been External; for we found nothing in the Cavity of the Belly but black extravaſated Blood, and Water, not at all mingled with any purulent Matter, which ſhew'd, that it was not come to paſs by any Ulceration; ſo that I muſt conclude, this Woman had either received a forcible Blow, or had a violent fall upon her Belly. Where it is to be conſider'd, that in a Child-bearing Woman by ſuch a Force and Violence the inward Parts are more wounded than the Outward. For when the Skin and other Teguments are ſtruck and contuſed, the extravaſated Blood can be better Conſumed, and by the Pores of the Skin diſcharged, than ſuch Blood can be by the carneous Membranes of the Womb, incloſed between two Membranes. Beſides, the Teguments of the Belly may be by a knock preſſed inwards, whereby in ſo meaſure they evade the Force; but Womb is a Thick, Soft, Spongious, and Child-bearing Women very much expa ed Part, cloſe woven through with Ve and Arteries; which, by reaſon of the c ſent of all its Parts with one another, c not endure any Violence, but receiving leaſt Contuſion, upon Bleeding, preſen Relaxes, and tends to Putrefaction, wh is promoted by the Heat of the Part. that in our caſe the Womb was not a as I ſaid above, to reſiſt the force and v lent Motion of the Child in the Labo which, with its Hands piercing through weakeſt Part of it, made way for the wh to paſs through, and to fall into the Be Whence it appears, that there was no o means but the *Cæſarean Section*, to ſave Fruit and Mother. For that the Wo being aſſiſted, can reſiſt Mortification Putrefaction, I have found in divers Ca of which I ſhall here alledge one of the m conſiderable, which hapned when I ſer the eminently Experienced Chirurgeon *gertſen Berenaert*, who was ſent for, toge with Dr. *Francis de Vick*, to come to *Uy burgh*, to ſee a Ship-carpenter's Wife, complained very much of great Pain ab her Fundament, and intreated my Ma to view and ſearch the Part; who by his let found in the *inteſtinum rectum* ſomew of a bony Subſtance, which being fur ſearched, and drawn nearer, was found be the two Feet of the Child, each Foo half a Finger's Length. This giving my ſter ground to ask the Woman, whether had ever been with Child, he was anſw ed by her, ſhe knew no better but that was with Child now; and, to her beſt C jecture, four Months gone. Whereu my Maſter immediately went to work cording to Art, by extracting the Frui the Feet through this unnatural Paſſa which was alſo follow'd by ſomething came away from before. Behind, there yet faſt ſome of the *vertebræ* of the B bone; and the other parts of the Bod mean of the Breaſt and Head, came no way but by Parcels, and by the natural ſage nothing came away but a ſmall These Parts I waſhed with Brandy to

…m from Stench: And it being Winter I …posed them to Freeze; and then brought …l to the learned Dr. *Nicolas Tulpius*, Con… of the City of *Amsterdam*, to whom my …fter shew'd it, relating to him the Cir…mstances of this Case. The Woman her …f was afterwards perfectly cured, by fit …medies resisting Corruption, strengthen… the Womb, and removing the Fever.

I could alledge more Examples of Ulce…ted Wombs; but what I have said may …present Suffice. I shall now come nearer …my main Design, *viz.* the *Cæsarean Delivery …a Child*, for the further improvement of …sick and Chirurgery.

And to this purpose, *Sir*, I intend to …at at large of this *Cæsarean Section*, which, …ough it be a difficult and dangerous, yet …a necessary Operation: Which, according …the respective Circumstances of Cases is …formable two manner of Ways.

First, To deliver a Child-bearing Woman …a *live* Child, so as to preserve both Mo…r and Child, when there is an impedi…nt in Nature to do it otherwise: Which …performed by opening the Mother's Belly …Womb with a fit Knife, thence to ex…ct the Fruit alive, together with the …rts and After-birth; and then by clean…g the *Uterus*, and healing up the Wound, …r the manner as the Wounds of the low…most *venter* are wont to be Healed.

But this is not to be attempted, until the …livery by Midwives is desperate, and …l all other means prove ineffectual, and …e Mother is reduced to Extremity, and …not be delivered any other Way; this …g the only means left to preserve both …ther and Child, which may prove Suc…ful, if their Forces be not too far Spent, …s are in some measure yet Available; …ugh it be not to be used, unless the Mo…r and Fruit be so Weak, that neither of …m can be otherwise preserv'd. Examples …reof we have in *Scipio Africanus*, (who …e first Recorded in History, that was …s brought into the World, his Mother …yet being quite Dead;) in *Manlius* and …rs. And the said *Scipio* was the first of …that was call'd *Cæsar* by the Romans. …they were not c lled *Cæsars* from *Juli…sar*, Emperour of *Rome*; but, as *Casper Bauhinus* observes, *sortiti sunt nomen Cæsaris, quod è matris cæsi fuerint utero.*

This kind of *Section* was made by a very strange and sad Accident at *Sardam* in the Year 1647. the 29th of *August*. For the Child was not cut out of its Mother's Belly, but the Mother coming to succour her Husband, who was by an enraged Ox push'd to the Ground, and mortally Wounded, had her Belly torn up from the right Side to the Left by the Horns of the same Ox, and was her self toss't up into the Air; the Fruit of her Belly with all its appurtenances falling to the Ground, and the Mother and Child being afterwards found alive, lying *four* Fathoms distant from one ather. The Man, call'd *Jacob Egh*, lived, after he had received his deadly Wounds, 36 Hours, and his Wife 41 Hours. The Child was found safe, only its upper Lip, one Hand, one Foot, and the Genitals were swell'd and mark'd with black and blew Specks; and it was by good care preserved alive: For he was baptized the first of *September* by Dr. *Bergius* in the *New Church*, and call'd *Jacob*; his God-father being *Peter van Bekestein*, Magistrate of *Wessanon*, and he lived to the 23d of *May* 1648, at which time he died, and was buried in the same Sepulchre with his Father and Mother.

But to return to our *Cæsarean Section*, there is an Author, call'd *Rousſetus*, that hath recorded many and different Examples of it, both of such as he had received from credible Witnesses, and of such as himself had performed. He is of this Opinion, that a Woman having yet any Strength, no time at all ought to be lost of delivering her of the Child, which otherwise must die it self, and in all appearance kill the Mother. For, she being open'd when her Forces are not quite spent, there is Hope of escaping Death, if so be that the Operation be perform'd by an experienced and careful Artist.

As to the *Second* Case of the *Cæsarean Section*, it is that which is done when the Mother is Deceased, and the Child yet alive. In which case the Chirurgion is to be at Hand, even whilst the Mother is yet alive, though ready to die, that so he may immediately perform that Operation, and open the Mother, to preserve the Child; for,

when the Mother is Dead, the Child cannot live long, as receiving Spirits and Breath from the Mother; though, for as much as it lives by its own Soul and Life, it may live ſome little while after the Mother is Dead.

Yet *Rodericus a Caſtro* in his 4th Book *de Morbis Mulierum* judgeth, that this Operation is to be performed, not only when the Mother is in danger of Death, but even when ſhe is dying, her Spirits being not yet *quite* extinguiſhd; becauſe that the Life and Motion of the Child-bearing Woman ceaſing, the Life of the Child, and the Motion of its Heart alſo ceaſeth, which it had received from the Mother through the umbilical Veſſels; the Child not taking in its Breath at the Mouth before the Navel-ſtring is broke off. Now it's evident, that the Mother being extinct, the Child cannot fetch any Breath in its Mother's Belly, whilſt 'tis incloſed in its Coats, and in the Womb: Whence appears the neceſſity of this Operation, if you mean to get the Child alive out of the Mother's Belly; whereas otherwiſe it muſt be ſuffocated in the Womb as in a Dungeon, to the great Grief of ſome Fathers, who may thereby loſe either their illuſtrious Name, or Heirs to a conſiderable Eſtate, or both. Of which not long ſince there hapned a ſad caſe at the *Hague*, when I was called to an *Engliſh* Counteſs, to deliver her of her Child; but coming too late, ſhe was open'd, and the Child alſo, to my great Trouble, found Dead: Which caſe prompted me the more to diſcourſe with you of this Argument.

The neceſſity of this Operation appears alſo from the *Spaniſh* Hiſtory ſpeaking of *Santius*, King of *Navar*, whoſe Mother being a Hunting, was barbarouſly kill'd by the *Saracens*, giving her a Wound in her Belly, whereby the Hand of her Child came to ſhoot out, which being perceived by a Noble Man that was preſent, call'd *Gueverra*, he brought the Child to the World thorow the Wound, and bred it up ſecretly. And when afterwards there aroſe a great Diſſenſion among the Princes about the Election of a King, he acquainted them with the wonderful preſervation and ſecret Education of this Child; whereby all diſputes were compoſed.

But to proceed; I intend not to detain you, Sir, with the Recitation of all the *Cauſes*, that may produce hard Labour, and a troubleſome Delivery; but ſhall only repreſent to you the Cauſe that neceſſarily requires the *Cæſarean Section*, not to be avoided but by the loſs of Mother and Child. Theſe are, in regard of the *Fruit*.

1. When that is too fat and too big in reſpect of the Mother, and therefore cannot poſſibly be brought into the World the ordinary Way.

2. When more than one Child ſtrive to come forth together, and one of them being Dead, lies in the Way of the other.

3. When the Fruit is a Monſter; for Example, a Child with two Heads, three Arms, four Hands, three Legs, four Feet, *&c.* which caſe hath come before the experienced Chirurgeon *Steven Vennekool*, the 16th of *June* 1636. in one *Femmetie Jans*, Wife of *Barent Jans*, Taylor, dwelling at *Amſterdam* in the *Wyde-ſteegh*, in the preſence of Dr. *Nicolaus Tulpius*.

4. When the Fruit is Dead, and petrified; of which an Example is recorded by *Johannes Alboſius*, *Medicus apud Senonas*, which was of a Child, that had lain incloſed in the Womb of one *Colomba Chatry*, for the ſpace of *eight and twenty* Years, and was there Petrified.

5. When the Fruit is all conſumed but the Bones, and by an Ulceration about the Navel ſhews the Way of Delivery; of which there are divers Examples to be found in *Rouſſetus* and others.

As to the Cauſes in reſpect of the *Mother* not being able to bring forth, they are theſe;

1. When ſhe is too ſtreight to be delivered the ordinary Way; and that in regard of her Years, having been Married too Young or impregnated too Old.

2. When by ſome ſcar the parts are hardned, or made narrower, or even grown together; of which hereafter I may allege ſome Examples in my own Practice, when I ſhall come to ſpeak *de clauſura Uteri*.

3. When hard Tumours ariſe in *collo uteri*, which do ſo ſtreighten it, that the Woman cannot be deliver'd the uſual Way, and the time of Delivery being come,

annot be delay'd, untill thoſe Swellings are Ripen'd.

4. When there is any carneous Excreſcence in *Vagina uteri*; of which I had this very Year an Example, where both you, Sir, and Mr. *Rogert Berenart*, were called to aſſiſt.

5. When the *Os pubis* is grown unnaturally big, or ſtands out.

6. When the Neck of the Womb is grown Callous, Uneven, and Hard, either by ſome impacted Humor, cauſing a *Schirrus*. or *Lupia*, or by any other hardned Swelling, Though 'tis certain, that when they are accompanyed with any cancerous Ulceration, rom a thin, ſharp, blackiſh and fetid Matter, ſuch Women, thus condition'd, are neer found with Child.

6. When there is a carneous Swelling with-n the Womb, which vulgarly is called *Mo- carnea*, faſtned to the ſide of the Womb, nd hindering the paſſing of the Child.

But it happens alſo, that ſuch a ſwelling omes to grow to the Fruit it ſelf; of which ſe Authors do ſay, that when it falls out, uch Children ſeldom come to Maturity, ecauſe ſuch Swellings withdraw from them eir due Nouriſhment, and take away that mpetent room they require.

Now theſe Cauſes, which require this difcult Operation do ſufficiently indicate its eceſſity. But yet it muſt be well conſiered, whether it is to be executed in a derate natural Birth or not. Wherefore it ill not be amiſs to weigh this matter ſomehat more narrowly, and upon what Occaſions this *Section* is moſt required, *viz.* *ther* when the Mother is Living, and the uit Dead; *or*, when the Fruit is Alive, d the Mother Dead; *or*, when both of em are yet Living.

Varandæus ch. 6. lib. 2. *de Morbis Mulie-m*, ſaith, that he cannot believe, the ild can be alive after the Mother is Dead; rming poſitively, that 'tis impoſſible, forauch, as long as the Child is in its Mo-r's Belly, it is maintained by no other e but that of the Mother: From which nion I muſt diſſent. For the Child lives its own Life, and Motion, and Soul, gh it be fed by the maternal Blood; ſo it may, notwithſtanding, live a little e after the Mother's Death. And this ſentiment I maintain with *Franciſcus Ranchinus*; and that both by the Authority of the Learn'd in the Law, and Experience. Only care is to be had, that as ſoon as the Mother is Dead, the Operation be with all poſſible ſpeed performed; and 'twere to be wiſh'd that this Matter in our Country were not ſo negligently skip'd over.

If the *Fruit* be dead, and the Mother yet alive, then the above-recited Reaſons touching a dead Child or a dead Mother ought to prevail.

But the Learned *Varandæus* is of Opinion, that the *Cæſarean Section* is not to be uſed when the *Fruit* is Dead, and the Mother yet Living, that the Chirurgeon may not appear to have been the Cauſe of her Death; but he would have this Operation to be performed, when both Mother and Child are yet Alive, and when 'tis impoſſible to bring the Child into the World but by this means; and then he thinks it better, to ſave one of the two, than to let them both Periſh. *Thus he*;

Now what concerns the Delivery of the Child, therein is no Difficulty, nor Danger. But, as for the Mother, though the Wound, given her, be Great and Dangerous, yet 'tis not neceſſarily Mortal, as we ſhall hereafter ſhew by many Examples. I conclude therefore with the Famous *Corn. Celſus, lib. 2. cap. 10.*

Satius eſt, anceps auxilium experiri.

To this I ſhall add another Example, recited by Mr. *John Girault*, ſworn and very Famous Chirurgeon at *Paris*, in the 74 *ch.* of his *Annotations* upon the *French* Chirurgery of *Jaques Dalechamp*, Doctor of Phyſick, and Profeſſor at *Lyons*, concerning an happy Cure, by which both Mother and Child were preſerved by the *Cæſarean Cut*; viz.

The 12th of May 1628. *Madam* Mary des Auxnaix, *Wife of the Sieur* Jacques Jouan, *Sadler in the Town of* Loudun *in* Poictou, *was happily brought to Bed of a Son; the third time, by the* Cæſarean Section, *and that by the Induſtry and Dexterity of that very Expert Maſter* Jacques, *Maſter Chirurgeon of the ſaid Town, and great Operator and Lithotomiſt, for this Art was at that time very well known through all* France. *And, which is more, I*

have been credibly informed, that the ſaid Maſter Jacques *had ſince delivered the ſaid Dame by the ſame Cæſarean Operation four Times, ſince that which I have mention'd; which makes* Seven *in all; but that ſhe died of the laſt.*

Your Affectionate Collegue and Friend

Pierre Guenellon.

Having thus diſcourſed, on what Occaſion the *Cæſarean Inciſion is* practicable, uſual and neceſſary, and proved the uſe thereof by divers commendable Examples, as alſo well conſidered the Reaſon of the ſame, it will be proper, further to examine, when there is a neceſſity, not only after what manner this Operation is to be performed, but alſo in what Parts of the Body; and laſtly to conſider, what Danger or Inconvenience may be expected therefrom.

It will then be neceſſary firſt of all to examine the Anatomy of the *Containing* Parts of the Belly, and particularly that of the Womb. Of this may be conſulted *Adrianus Spigelius*, &c.

The common Integuments then, that muſt be cut thorough in this Operation, are the upper Skin, the Skin, the Fat, the fleſhy Membrane, and the Muſcles of the Belly: The innermoſt and laſt Tegument of the *Containing* Parts is the *Peritonæum*, inveſting all the Bowels of the lowermoſt *venter*.

Of the *Contained* Parts of the Belly none is cut but the Womb, to fetch out the Fruit and Secondine.

That the *Containing* Parts of the Belly being wounded, although it ſhould happen that a good Part of the Bowels did ſhoot out, (they being unhurt,) may without any great danger be healed, is ſo Notorious, and ſo well known by daily Experience, that I think it Superfluous to enlarge upon it; concluding with the Words of *Galen*: *Mediocre foramen anguſtiori ſalubrius eſſe, ut libere intrudantur inteſtina.*

Nor need you apprehend any great Hæmorrhage in the cutting of theſe Muſcles, in regard that in the Place where the Inciſion is made, there run few or no great Veins or Arteries. Nor need you be concern'd what will become of the extravaſat Blood; for it may be conveniently diſcharg by the opening of the Womb. Nor is the Cauſe to fear any *Convulſions*, ſeeing that t opening is made in the Midſt of the rig Muſcle, and not in its Beginning or En for in the Middle of it there are none of t ſmall nervous Fibres. Nor need you afraid of the Largeneſs of the Wound to made in the Womb, becauſe upon the E traction of the Fruit ſhe is immediately (a cording to her Nature) drawn in agai whereupon the Wound is ſoon healed, t circumjacent Parts much contributing the to; for the Effuſion of Blood of the Wo is not more in this Way of Delivery, th in the other which is natural: And in c it ſhould happen to be too great, it may ſily be remedied by convenient and kno Means, both for ſtopping the Flux of Blood, and for cleanſing and healing ſaid Wound; always taking great c that nothing remain behind that ſhould brought away.

But that after the Cure of theſe Woun by the cutting of the *Omaſum*, there co monly follows an *Hernia* or Rupture t cannot well be cured, which muſt be tiently endured, and eaſed by ſuch Band are uſual in that Caſe; conſidering, t this is a ſmall Inconvenience in reſpect of great and difficult an Operation, with which neither the Mother nor the Ch could poſſibly be ſaved alive. And know, that in cutting People of the St the wounding of the Bladder is much m dangerous, troubleſome and grievous, wh ſaves but one Body; whereas in our Op tion two are preſerved, which elſe muſ infallibly loſt.

Moreover, it ſometimes happens that Operation muſt be performed near the vel, which is a more dangerous Place t that where uſually the *Sectio Cæſarea* is m And in that Caſe the dead Fruit, and putrified Bones thereof, have ſometimes extracted, and yet the Mother recov Witneſs *Stephanus Marialdus* of *Bourdea ſua Hiſtoria de Partu prodigioſo, qui viſus Agro Bardiniano* near *Bourdeaux*, *Anno* which Operation was performed by tha ry expert Chirurgeon *Jacobus Noierius*.

The like happen'd alſo in my Time, when I was learning the Practice of the Art of Chirurgery, that a putrified Fruit was, by Nature's Co-operation, extracted out of the right Gut.

Albucaſis, an eminent Phyſician and Chirurgeon among the *Arabians*, relates, *c.* 76. an odd Caſe, which I cannot forbear to tranſcribe hither. *I have* (ſaith he) *ſeen a Woman, in whoſe Belly was a Child, and ſhe was then got with Child again; and this ſecond Fruit died likewiſe. After a conſiderable Time, ſhe had a Swelling at her Navel, which riſing more and more, at laſt burſt, and yielded purulent Matter. Being called to her, I was long employed in that Cure; I laid at length a ſtrong drawing Plaiſter over the Place, whereby it was to open'd, that one Day there came forth a Bone, and ſome Days after another. I was amazed, knowing there were no Bones there: But well conſidering all, I found that they were Bones of a dead Child. Having therefore learned the true Cauſe of the Diſeaſe, and conſequently the right Way of the Cure thereof, I extracted many more Bones from thence; whereupon the Woman did pretty well recover, and lived a good while after, though out of the opening there run always ſome Matter.*

Franciſcus Roſetus recites three Examples more of this Nature, which *Ambroſius Paræus* hath taken notice of in his 24th *Book of Generation.*

Fabricius Hildanus relates a ſtrange Example of a *Burgundian* Woman, about whoſe Navel there was cut out a putrified Child, *Anno* 1609. by Mr. *John Marchandet*, Chirurgeon at *Salines.*

Alexander Benedictus, Chirurgeon of *Bern* in *Helvetia*, relates in his 25th *Book*, *ch.* 33. ſuch another remarkable Caſe of a *Venetian* Woman, which having been deliver'd of a perfect Child, there remained another Child in her Womb, which was dead; which coming to be putrified, was for the moſt part expell'd the natural Way; but at length Nature making three openings of her Belly, there came forth out of the biggeſt of the three the whole Skull of the dead Fruit; and after that the other Bones came forth from Time to Time: Whereupon the Woman, by admirable Help of Nature, recover'd.

A. 1663, the 10th of *February*, there was ſent me from *Brugges* in *Flanders*, by an intimate and veracious Friend, a Note concerning a very experienc'd Phyſician called Dr. *Sonnius*, who had performed this *Cæſarean* Operation ſeven times upon his own Wife, with very good Succeſs, both Mother and Children remaining alive.

Whence appears ſufficiently both the practicableneſs and great uſefulneſs of this Inciſion for ſaving of Lives, notwithſtanding the Difficulty and Danger which accompanies it: Concerning which that ſaying of *Hippocrates* muſt take Place; *viz. Extremis morbis extrema & periculoſa remedia ſunt adhibenda.*

Yet *Ambroſius Paræus*, a known Author, and *Jacques Guillemeau*, are of Opinion, that this difficult Operation ought not to be uſed, as you may perceive by their own Words; becauſe they twice miſcarried therein, and beſides, knew *three* other Women, that alſo died under the ſame. Let this be ſo; the *five* Children mean time were preſerved, which was no ſmall Matter. But hear what he ſaith himſelf.

Some are of Opinion, that ſuch a Cæſarean Section *may and ought to be practiſed (the Woman being alive) in caſe of an highly difficult Travel: Which I cannot adviſe to, having twice tried it in the preſence of Monſieur* Paré, *and ſeen it practiſed by Meſſieurs* Viart, Brunet, Carbonet, *very expert Chirurgeons, who left nothing undone that could be done by dextrous and methodical Maſters? Yet notwithſtanding, of* five *Women upon which this Operation was made, not one eſcaped. I know, it may be ſaid, that ſome have been ſaved that Way. But ſuppoſe that to be ſo, the Operation is rather to be admired than imitated. One Swallow makes no Summer, nor one Experiment a Science.*

The Preparatives requiſite to this Operation are, as follows: The Mother and the Child being yet both alive, if I ſhould be called to ſuch an Operation, I ſhould firſt of all conſider all Circumſtances, to conclude, whether this Inciſion were neceſſary, and whether neither the Woman nor her Fruit could eſcape Death without it, and whether they had not endured too much by ſome imprudent or unskillful Midwives, nor the Mother's Body too much hurt by their ill Management: For, if a Woman ſhould

chance

chance to die after such an Operation, then the Operator would be blamed, although their former Indiscretion and Ignorance were the cause of their Death. Having then well considered and examined the strength of the Woman, and prepar'd all necessaries for the Operation, *viz.* an emollient Clyster to discharge the Bowels, and a good Cordial to fortifie the Woman, (I mean a Glass of good Wine;) as also having taken care that she make Water for the emptying of her Bladder, and then having ready a very good Rasor, and another good cutting Knife; a Pen with Printers Ink to mark the Line of the Incision, (which line must be first dried up;) four or five Needles with three-angled Points, stringed with washed red-scarlet Silk, and three or four Silver Needles (such as are used in the Cure of a Hare-mouth,) likewise stringed with Silk; three soft Sponges; several doubled Compresses of soft Napkin-cloth, and a Napkin doubled up four-fold, to be put round about the Belly after the Wound is done up; besides, two broad Swathes, each 6 Inches Broad, to wind about the Belly for stopping the Blood, and above all, a strengthning and sanative Remedy, wherewith the Wound is first to be cleansed and washed, before it be stitched together: To which is to be added a proper Blood-stanching Remedy, wherein there is to be no Vitriol nor any other corrosive Ingredient, for that would hinder the coalition of the Wound: Lastly, a good Wound-balsam to anoint and bind up the Wound with.

The means which I would chuse to perform this Cure with, as to the stanching of Blood, and cleansing the Wound, are the following: First for Cleansing;

℞. *Rad. Consol. major, Sassaperil. ana* ℥ß. *Herb. Agrimoniæ, Altheæ, Artemisiæ, Roris mar. ana m. j. Flor. Meliloti, Lavendulæ, Rosarum rubrarum ana m.* ß. *Sem. Anisi, Fœnic. ana* ℥ij. *Castorei* ℈j. *Fiat omnium decoctio in vino rubro, usq; ad tertiæ partis consumptionem.*

Then, for Blood-stopping;

℞. *Farinæ Volatilis* ℥iß. *Boli armeni* ℥ß, *Gypsi* ℥ij. *Resinæ, Olibani ana* ℥jß. *Sang. Dracon.* ℈j. *Omnia subtilissimé pul risentur & misceantur.*

Lastly, for a Wound-balsam;

℞. *Ol. Olivarum lib.* ß. *Terebinth.* ℥ *Rad. consolidæ major. Tormentil. an Herb, Trifol. odorat. m.* j. *Flor. roris Centaurii an. m.* ß. *Hyperici m.* j ß. *C* ℈j. *Contundantur simul cum oleo, vitro cludantur, & calore solis per* 40. *dies d rutur; postea exprimatur liquor, & serv in usum.*

Those that cannot get *this* Wound-bals made, may safely use the Oil of *Hyperic* with the Bals. of *Copiva*, of each equal Pa

All this Apparatus being at Hand, should then perform this Operation in manner following;

First of all, having implored God mighty's Blessing, I should desire the Pa ent to lie upon her Back, near the Edge the Bed, for the more convenient access her, getting two strong Persons to hold and to keep her Legs close together, a laying a great Pillow under her Head; th I should pitch upon that side of the Be Right or Left, which I thought the Sou est, taking care not to meddle with t side which may be affected by some Dist per of the Spleen or Liver: Yet if th should be some Rupture on one side alr dy, in that case *Celsus* and *Paulus Ægi* do advise to make the Opening in that pl where such a Rupture is, because th would not have the Patient endure so mu Pain, as he needs must in the difficult he ing up of two Ruptures. This done, should with Ink mark along the Belly Line of the Incision, to the length of ha Foot, which is the ordinary bigness of Wound requisite in this Operation; a the traverse Lines drawn over the streig Line, serve only for this End, that in sowing up no mistake may be committ forasmuch as the cross Lines must exac correspond with one another.

But all these Circumstances need when the Mother is Dead, and the Ch supposed to be yet alive. For in this ca I only chuse that place which I judge to most convenient and safe for delivering Child and the After-birth with most Spee

To proceed then; having pitch'd upon the ace, between the Navel and the *Os pubis*, ing two or three Inches beneath and on e ſide of the Navel, and as much from the wer Part, to avoid the tendinouſneſs of the uſcle, I ſhould then make the Opening cording to the length of the Belly; firſt ting the Belly quite through with a Ra- r into the very Fat, and making the Wound ſo big as is Requiſite, conſidering th the Condition of the Child and the Mother; and then advancing further, and ting through the Muſcles the Belly, d the *Peritonæum*, underneath of which e Womb will preſently appear, which is en to be open'd in the middle with great Caution, that ſo the Fruit and the Appen- ges thereof may not be wounded. The Opening being thus made, the Child and e After-birth, with the Navel-ſtring, is to be dextrouſly taken out; and in caſe the Child ſhould be perceived to be Faint, the After-birth is to be ſprinkled with warm Wine, and to be laid thus warm upon the Child's Belly to renew its ſtrength. Yet, caſe both Mother and Child be alive, I ould let alone the ſeparation of the Child il the Mother were dreſſed, or have a Mid- e ready at Hand, to take care of the Child. Then immediately waſhing the Womb, both to ſtop the Bleeding, and to eaſe the ſame with my above preſcribed ayment; I ſhould inſtantly proceed to tch up the Wound, not after the manner f the *Gaſtroraphia*, in which you take up y turns as well the ſubjacent *Peritonæum* as e upper Skin, but after the way of ſtitch- g up an *Hare-mouth*; and this I ſhould avour to heal up *per primam intentionem* urgie, which is performed by that way ſtitching, and the wound Oil. But I uld always with a Tent keep open a lit- place in the lower Part of the Wound, il the great danger and the uſual Sym- ms were paſt; and for the reſt, employ h healing Means, as are uſual in other Wounds of the Belly.

But as to the *Womb*, which is not to be d together, the healing thereof is to be ver'd by convenient Syringing, ſuch as not at firſt hinder the *Lochia*: But as *Peſſaries*, they, in my Opinion, can do no good in this Caſe; becauſe they cannot convey the healing Remedies ſo deep as is the place of the Womb (which Syringes can do,) foraſmuch as the Opening of the *Uterus* is made in its upper Part. If the *Peſſaries* be wrapped about with fine Linnen Rags, or with thin Sheeps-guts, they are the worſe for that, to give any Help; if they be not, they preſently Melt, and hinder the Paſſage alſo for the Purification: Whereas by Syringing, the pain is mitigated, and inflammation prevented: Beſides, that by the uſe of Syringes the Womb is as 'twere bathed, warmed and ſtrengthen'd; and by it alſo the ſuperfluous *Sordes* are expelled.

Concerning the *Diet* of the Patient, that ſhould be of light and nouriſhing Meat, I mean, good Broath of Chicken, Pullets, or Mutton, ſoft Yelks of Eggs, and the like; in ſhort, ſuch as is uſual in great Ulcerations and Wounds of the lower Belly: Taking always great care, that ſhe be not too Coſtive; in which caſe ſhe muſt be relieved by ſome Emollient Clyſter.

From this way of proceeding, *Honour'd Friend*, you may judge of thoſe ſad Examples, which are daily before our Eyes, of thoſe Child-bearing Women, which not only themſelves alone, but together with their Innocent Fruit, are miſerably Deſtroyed. Which Affirmation of mine is confirmed by that Famous Chirurgion, *Guilielmus Fabritius Hildanus*, in a place where he mentions what the Royal Law Imports, ſaying: *The Royal Law forbids to bury a Woman that is deceaſed with a big Belly, before the Fruit be cut out. And the Learned in the Law call this the* Royal Law, *not only by way of Excellency, but alſo becauſe 'tis eſteem'd, that the ſecond King of the Romans,* Numa Pompilius, *enacted it. Certainly, if this Law were obſerv'd every where, many Children, which now by the death of their Mothers are miſerably Suffocated and Loſt, might be ſaved, to the great Comfort of their Fathers. 'Tis not in vain, that the Author of this Law adds: Thoſe that do otherwiſe, ſeem to have killed the Hope of Life with the Fruit.*

But then, though this *Royal Law* commands to open all big-bellied Women, without any Diſtinction as ſoon as they are Deceaſed; yet a Chirurgion is not ſo ſtrictly tied to it, as to obey it in all of them; becauſe

becauſe there may be manifeſt and palpable Cauſes to let it alone. Firſt, When he is ſure that the Child is Dead, and that there is but one Child. Secondly, That the Fruit is putrified and diſſolved. Thirdly, That there hath gone before a great Flux of Blood, together with the breaking of the Waters, and that the Womb is diſcharged, and keeps only the Fruit being without any Motion; or when the Fruit is but very little, or comes to no Maturity. Which laſt was a caſe that I my ſelf lately met with, having been called to a *French* Woman dwelling upon the *Keyſers-gracht* in *Amſterdam*, to perform this Operation. For, this Woman had ſo extremely flooded both of Blood and Water, that ſhe had voided (as ſhe her ſelf aſſured me) near a Pail-full. Finding her Pulſe very Low and Faint, and the Flux contin ing, though not ſo Violent, I bid the M wife keep her Hand continually upon Patient's Belly, and to be very Attent whether ſhe could perceive the leaſt Moti But neither before the Mother's Death, at her Death, was there any Motion; being Deceaſed, I found the Fruit ſo lit and without all Motion, that I affirme was Dead, and very imperfect, and the fore needleſs to trouble our ſelves with Operation.

Theſe, Sir, are the Obſervations and P ctices of the *Sectio Cæſarea*, which I preſu to preſent unto you; begging your par for my Prolixity, and ſubmitting all to y Cenſure and Correction. Given in *Am dam* the 10th of *September* 1652.

A L

A Letter from Abraham Cyprianus, *Dr. of Phyſick, and ſometime Profeſſor of Anatomy and Chirurgery in the Univerſity of* Franequer *relating the Hiſtory of an Human* Fætus *of* 21 *Months; taken from the Tubes of the* Matrix *before the Death of the Mother: Writ to Sir* Thomas Millington, *Phyſician in ordinary to the King, and Preſident of the College of Phyſicians,* London.

BEGGING leave of my Reader to wave the Preamble, I ſhall come directly to the Story. The 17th Day of *December* in the Year 1694, I was call'd from *Franequer* to *Leewarden* to ſee the Wife of *Henry Lewis*, a Soldier in Captain *Peterſon*'s Company: This Woman was 32 Years Old, and the 3d time gone with Child, it being about the ninth Month of Reckoning, without perceiving any thing different from what ſhe uſed to do, in former Breedings, except that during all this Time ſhe never could ſee any Milk in her Breaſts. Her Burden appear'd to be heavier and more troubleſome to her than uſual, eſpecially when the quick Child ſtir'd it ſelf a little vigorouſly, and that trouble increas'd when ſhe obſerved that the *Fætus* was ſituated ſomething higher than ordinary. But when the time of Delivery or the Birth was come, then ſhe felt great Pains, and the *Fætus* ſtirr'd it ſelf with great Violence, ſo that ſhe expected the Hour of her Delivery at Hand: But all this came to nothing; for beſides the great Motion of the *Fætus* which was made in a part where ſhe was not uſed to feel it, there appear'd no Efforts to throw it forth out, and there was no breaking of Waters from the *Amnios*; ſo that all Hopes were vaniſh'd that they could entertain of a Natural Birth; and then alſo the Child ceaſed to move, and the Mother growing by degrees better, every body believed that in that time the Child was Dead.

After Ten Months, the *Menſtrua* which had been ſtop'd during the whole time of the Gravitation, began to flow afreſh, and ſhe felt no more Motion of the Infant, but perceived a troubleſome heavy Load; this inconvenience increaſed every Day, but eſpecially towards the Eighteenth Month the Accidents increaſed to ſuch a degree, that the poor Woman was forced to take her Bed. A little after that ſhe began to complain of a great Pain about her Navel, and the Neighbouring Parts: And this Pain was ſucceeded a Fortnight before the Extraction of the *Fætus*, with a fungous Ulcer in the Region of the Navel. There were ſeveral Conſultations of the Phyſicians and Surgeons, who divided into ſeveral Opinions: Some would have it that the *Fætus* was in the *Matrix*: Others denied that; ſome ſaid it was a Dropſie, and others in ſhort ſaid it was an internal Excreſcence. It was 21 Months from the Conception of the *Fætus*, when I was call'd from *Leewarden*, attended with the *Sieur Latan*, Profeſſor of Phyſick my *Collegue*, and with ſome Students of Phyſick of the Univerſity of *Franequer*, who with *Monſieur Portius*, the firſt Phyſician of the Prince of *Naſſau*, and *Monſieur Simonides*,

Surgeon to the Patient, were Witneſſes of this Operation, and the happy Succeſs which we had.

As ſoon as I had ſeen the Patient, and had conſidered all the Circumſtances of her paſt and preſent Condition; I did not at all heſitate of the Aſſurance that ſhe bore a dead Child, there being no ſigns wanting to juſtifie the truth of that: For as I had carefully review'd every Part, I obſerved that the ſwelling of the Belly ended in a Point a little below: I then ſqueez'd and compreſs'd the Abdomen ſtrongly above and below my Hands, and I then perceived a great Hardneſs that ſtretch'd it ſelf to the very *Peritonæum*. We obſerved this Hardneſs a great deal plainer at the bottom of the Ulcer, which was Fungous, and eaſily admitted a wooden Style or Probe into it, by which it appear'd to me that I touch'd ſomething Hard. Afterwards I dilated the Orifice a little, and put in the end of my little Finger, with which I could certainly touch the Parietal Bone of the *Fœtus*: Being then emboldened, and aſſured of the Situation of the *Fœtus*; I declared to them all preſently that it was in the right Tube of the *Matrix*, and I let the Patient know that if ſhe would permit me to open her, there was yet hopes to reſtore her, otherwiſe that ſhe muſt periſh miſerably: Nevertheleſs the Patient would not be ſtir'd, or take Suſtenance, but was in a word as one Expiring: At laſt ſhe hearken'd to what I ſaid, and told me ſhe would patiently undergo, whatever I did to remove her Burthen. Having every thing ready for the Operation, I made the Patient be removed on her Bed into the middle of the Room, that there might be liberty on all ſides for thoſe that were to aſſiſt me, and that all there preſent might more conveniently behold this New Spectacle, and having diſpoſed the Body to my Mind I proceeded thus.

Having introduced a Stile or Probe into the Ulcer, I open'd the *Abdomen* on the right Side, and put therein my Fore-finger, and when I perceived that I had gotten into the Cavity of the *Fallopian Tube*, the length of the Rectitude of *Linea Alba*, I put my Sciſſars on my Fingers, and made an Inciſion on that ſide as large as I poſſibly could at one Stroke, then the *Fœtus* preſented it ſelf all at once, and we might ſee th proportionate Size. To take it thence with out Violence I dilated above and below and made the Opening about a Foot lon and preſſing lightly the Guts with my le Hand, I held them in the Cavity of the Be ly that they might not diſturb the Operat on if they ſhould happen to puſh forwar by the Motion of the *Diaphragm*, and I took out the *Fœtus* entire, without muc Trouble: But I uſed a great deal of Caut on to prevent the Guts from deſcending, b placing the Patient ſo, that the upper Par of the Body were ſomething lower, and th poor Woman remain'd almoſt all the tim in the ſame Situation, till ſhe was totall cured, in order to avoid a *Hernia* or *Rup ture.*

Having made an Inciſion we ſaw firſt of a the Head of the *Fœtus*, having the Fee ſtretch d towards the *Diaphragm*; the Navel ſtring was alſo adhering to the *Tuba Fallo piana* by means of the *Placenta*, which wa very thin, a good part of it being waſte away; which I obſerved ſtill more i ſeparating the *Tubes* with my Finger The Cavity was all cover'd over with Mucilage that was like a purulent Matter but conſidering a little better: I foun that it was not *Pûs*, but the remainder o the Water of the *Amnios*, not finding other wiſe any internal part ulcerated, or othe Matter than the ſtench in the World. Hav ing likewiſe taken out the Infant, we com to the place from whence we had extracte it, which is a great Cavity or Hollow, lik a very large Purſe. I thought it proper t let the Spectators ſee the Part from whenc we had taken the *Fœtus*, which was ſo joyn ed to the *Peritonæum*, that it look'd like a if it was one and the ſame Membrane; let 'em ſee afterwards that the lower part o the Bag was adhering to the right Side o the Womb towards the Fund, which wa the place of the *Tube*, and not being any o ther part, it is clear that the *Fœtus* was i the right *Tube*. Having likewiſe an occaſi on and the liberty to ſee and handle th *Matrix*, I took the Pleaſure to ſhow it t all the Aſſiſtants in its Natural State, wit the Ovary and the left *Tube*, which had re ceived no Damage: And having ſeen a theſe Parts, I pronounced boldly and with

ou

being deceived, that if the Patient came be cured, ſhe might prove with Child gain.

But to finiſh this Story: I dip'd a Spunge warm Water, which I put into the Ca-, and took from thence the *Mucus* that found: Afterwards having well cleans'd Wound, I ſtitch'd it up with a crooked dle in four Parts equally diſtant, ſowing ether the *Peritonæum* with the Teguments Muſcles. I had by me for this Purpoſe double Thread wax'd, the better to cloſe Seam. I applied all along the Inciſion both Sides a flat Piece of Wood cover'd Linen, the better to cloſe the Aperture the Wound; and I tied afterwards the ed upon the Plate, but not very tight. Patient complain'd that ſhe had ſuffer'd Pain by this Ligature, than ſhe had ived during the whole Operation. At I left an Opening towards the lower of the Wound, and put in a Tent there, the Matter which run might find a free charge.

having happily proceeded thus far, I or- her a convenient Regimen of Living, liquid Aliments or Food of good Nu- n: And after conſulting with Mr. *Si-* her Surgeon of the Manner of treat- r for the future, I left her to his Care perfect Cure. The Patient was very ful to all there preſent, and very glad that the Operation had been ſo ſuc- hitherto. From this Time ſhe grew every Day, and gather'd Strength. the Surgeons, ſhe was viſited every Mr. *Portius*, Phyſician to the Prince inceſs of *Naſſau*, who provided what- was neceſſary for her Diet. I went mes to ſee her, and I found that this was cured after the uſual Manner, by Separation, from whence appear'd the *Tubæ Fallopianæ*. That which did not run only by the inferior Ori- but alſo by the Intervals of the Sutures: made a Separation, not of all the but only of the internal Membrane; which is external is contracted it degrees, joining with the *Peritonæum* Place of the Inciſion, and became like lage by the Hardneſs it acquired, could eaſily prove by touching it with my Finger before the Wound was heal'd up.

After ſuch a Section or Operation, which we may in ſome Senſe call *Cæſarean*, this Woman was perfectly reſtored, and went abroad the third Month from the Operation, *viz.* the 17th of *March*, 1695. from which Time ſhe has continued well, and at preſent ſhe lives in Health and is ſatisfy'd. In ſhort, that there may be nothing wanting to ſo extraordinary a Caſe, ſhe was happily deliver'd of a Daughter the 2d of *January*, 1696. and the Year following, 1697, ſhe was brought to bed of Twins, a Son and a Daughter; which was a certain Sign, as I had ſaid before, that the left *Tube* was not at all injured, neither had it contracted any Inflammation.

For the greater Confirmation of this Thing, I have cauſed it to be expoſed to all the Curious, and thoſe who are fond of Novelties, it being now five Years ſince I took out the ſame *Fœtus*, which I preſerve ſtill entire in a Balſamick Liquor: Nevertheleſs, I have here given you a Figure thereof, it being a Girl that was of a moderate Size. It is certainly ſurprizing how a *Cadaver* or dead Body ſhould remain incloſed for 12 Months in the *Tubes* without corrupting; for except on the left Side of the Head and the Shoulder, which was ſituated oppoſite to the Ulcer, and was a little corroded by the *Pus*; all the reſt of the Body was entire and whole.

As we do not write in this Letter of a Matter that is common, but of a very ſingular and extraordinary Caſe, I believe it will not be amiſs to conſider ſome Parts that appear'd moſt remarkable, to draw from thence ſome Reaſons and Concluſions of certain Accidents, and to dwell a little on ſome Articles of this Letter, in making Remarks by way of Comment. As for Example; *From whence comes it that the Mother never perceived any Milk in her Breaſts during all the Time that ſhe bore the* Fœtus? There are ſome Things that appear abſurd not only to vulgar People, but alſo to Philoſophers and Phyſicians that are prepoſſeſs'd; eſpecially thoſe which relate to the Condition of Women with Child and in Labour, which Things (if examin'd with Care) will be found agreeable to Truth and right Rea-

ſon, though they have been taken for abſurd.

In the preſent Caſe, it appears at firſt Sight incredible, that a Woman ſhould carry in her Womb a living Burthen, and yet that there ſhould be no Milk; an Opinion founded upon a falſe *Hypotheſis* of thoſe who believe that the Milk comes from the Breaſts into the Womb for the Nutrition of the *Fœtus*, or upon the *Hypotheſis* of thoſe who are of Opinion that the Milk is generated in the Breaſts from the Retention of the Menſtrual Blood. It is likewiſe a common Notion, that a Suppreſſion or Stoppage of the *Menſtrua* in Girls who are debauched is a Sign of being with Child. They ſay likewiſe, that if a Woman do not perceive her Child ſtir, it is a Sign that it is dead, and that an Infant born in the 8th Month cannot live; with many others of the like Nature, which Reaſon and Experience overthrow.

It would be too long to detain you with what Account Authors give on this Subject: I ſhall therefore only relate you a Story told me by a very curious Man, and one worthy of Credit, that juſtify'd what I am going to ſay. He ſaid, he knew a young Woman of a very good Family, who being got with Child by her Gallant, did whatever ſhe could to deſtroy it about the 5th Month of her Gravitation, by all Sorts of Medicines which old Women and Nurſes could invent, by Abundance of Bleeding and Purging; ſo that in ſhort the Thing went ſo far, that ſhe felt the Child ſtir no more, but it appeared to her like a Lump of Lead, falling down upon the *Pubes*; that the Breaſts flag'd, and the Milk diſappear'd. This Woman, in a great Concern how to get the Burthen out of her Womb, which ſhe believed to be dead, conſults a Phyſician, and told him ingenuouſly, that ſhe had uſed her utmoſt Endeavours to kill the Child: But he order'd her to uſe a good ſpirituous nouriſhing Diet, to take her Reſt, and to abſtain from all Purgatives, and other Evacuations; which having obey'd, the Infant began to ſtir afreſh, and came happily to Light about the tenth Month. This Caſe ſhows us, that the Sinking of the Breaſts, the Abſence of the Milk, and the Ceſſation of Motion from the Child, are not always true Signs of *Abortion* o dead Child; but that they indicate onl Weakneſs or Diſorder of the *Fœtus*.

From hence it appears plainly, that Opinion of the Ancients is falſe, who lieved that the Milk was generated from Retention of the Menſtrual Blood, that *Fœtus* was nouriſh'd from Milk, that Want of Milk is the Cauſe of Aborti and that Milk in the Breaſts is a neceſ Concluſion that the *Menſtrua* do not flo for Experience informs us, that Wom who through Fear or ſome other ſud Cauſe are injured, are not for that Rea void of Milk: And if Women who are maged only by Weakneſs do not perc that they breed Milk in their Breaſts, comes from this Reaſon, that the Cauſ Weakneſs, and Abortion which follow is the ſame which ſtops the breeding of M to wit, a certain Dryneſs and Want of ces, which are neceſſary to the Suppor all the Parts of the Body. For that wh has relation to the Reaſon for which in preſent Caſe this Woman did not perc in her Breaſts any Milk all the Time ſhe was with Child, it is likely we may ſign it to a certain particular Analogy Sympathy of the Womb with the Brea For if before having been twice with Ch ſhe wanted no Milk, but inſtead thereo this Caſe ſhe had none all the Time the *tus* was in the *Tubes*; 'tis for this Rea that what contributed the more to the neration of Milk, to the Growth and P ty, was the Occaſion that the *Matrix* came ſo very big, eſpecially towards the of the Gravitation; that the Veſſels w were towards the lower Parts were c preſs'd more than uſual, and that by Compreſſion the Blood riſes in greater Ab dance towards the upper Parts.

For as the Blood reſorts more plentif into the Parts, it makes a much greate paration in the fatty Cells of the B which ſeparate the Fat, and in thoſe c Glands which ſeparate the *Lympha*: this Separation renders the Veſſels more and proper to let paſs the Matter or Su for the Milk, to which alſo contribute Suction, Friction and Imagination o Mother that ſuckles; all which T

ing together, the Veſſels at once open dilate, maintaining themſelves in the Condition, although the *Matrix* be , and the Veſſels be not compreſſed. being granted it appears clearly from cauſe the want of Milk, comes in reſent Caſe. Namely, from the Fruit e Womb being lodged in the *Tube*, being conſequently placed on the Side, not as uſual compreſs the Blood-veſ- which paſs on the lower Parts, and ſo raiſe not the Blood to the upper of the Body more than at other times; s the ſeparation of the Milk is made by preſſion of the Arteries, ſo the ſwelling e Legs comes from the Compreſſion of eins; for the Motion of the Blood be- tarded, is the reaſon that the *Lympha* eparated into the Adipous Glands, ghout the whole Body, as it appears *Anaſarca*.

e may frequently ſee Milk in the Breaſts, oſe who are not with Child, as Infants old Women, and ſometimes likewiſe n. *Diemerbroeck* gives us a remarkable of an old Woman who ſuckled her Child at the Age of Sixty and Six. e ſeen many Men who have had Milk eir Breaſts as plentiful as moſt Wo- ; for the Parts neceſſary to breed Milk roughout the ſame in both Sexes, to the Adipous or fatty Cells, which ſe- the Fat from the Blood, by the ſtru- of their Glands, and alſo the Glands h ſeparate the *Lympha* from the Maſs of ; for we believe that the Milk is no- elſe but a Mixture of Fat, or oily with the *Lympha*, as may appear from ream that is afterwards converted into , by ſeparating it from the *Lympha or* All this, nevertheleſs, does not hin- e Compreſſion as alledged of the Veſ- Blood from the Womb, from being ue and ſufficient Cauſe of the Genera- of Milk at the times of Gravitation: e may ſometimes ſee ſeveral Homoge- Subaltern, and Auxiliary Cauſes, tend to one and the ſame End, and are not at all oppoſite to one another.

we have found a Fætus *in the* Tubes.

r having obſerved the great Analogy that there is betwixt the Parts which ſerve for the Generation of Men, and of other Animals which have Eggs: And after finding ſometimes a *Fœtus* in the *Tubes*, in a Body opened as we have ſeen in a living Woman; is there any Perſon that can farther doubt, that the *Tubes* of the *Matrix* are the Conduits or Pipes by which the *Fœtus* paſſes from the *Ovary* to the *Womb*. But at preſent I believe it will be neceſſary to examine what the Cauſe is, why the *Fœtus* being deſcended into the *Tube*, is not always puſh'd forward into the Cavity of the *Matrix*, but ſometimes ſtops in the *Tubes*, and there acquires or gets its due Size and Growth. We take this to proceed from two Cauſes, the one *Natural*, and the other *Accidental*: I call that *Natural*, where the *Tubes* by an ill Natural Conformation, are not open towards their entry into the *Matrix*, or ſo ſtrait that the Wind cannot paſs through them, ſo as to penetrate into the Cavity of the *Matrix*. The *Accidental* Cauſe is, when by ſome Accident that happens, as after a difficult Labour, or by ſome other Cauſe that ſucceeds, the *Tubes* are ſeized with ſome Inflammation; from whence it happens that their Aperture is cloſed, and their Paſſage into the Womb ſhut up. For all the Parts, eſpecially the Pipes and Canals of our Bodies when they are deprived of the Humour which uſed to moiſten them, ſoon dry up and are ſhut: So the *Tubæ Fallopianæ* having an internal Tunicle or Coat covered or ſpread with Glands that are appointed to diſcharge a Liquor to lubricate their Paſſage; and to prevent the Parts from agglutition or growing together, ſo that by them the Eggs which are once drop'd might paſs eaſily into the Cavity of the Womb. If then there happen an Inflammation in this Part or *Tube*, by ſome Accident, or ſome Foreign Cauſe; this Inflammation ſtops the free ſeparation of Liquors which is made in the Glands, which occaſion an Agglutition of Parts. Thoſe Caſes which happen from ſome foreign or unknown Cauſe, are ſometimes occaſion'd by the Fault of thoſe who aſſiſt Women in Labour, eſpecially when the *Afterbirth* ſticks more than uſual; they tear all before them in pulling too hard at the Navel-ſtring, not knowing the true way

of

of ſeparating theſe Things: Which makes that ſometimes they pull down the bottom of the Womb, and conſequently do violence to the *Tubes*, and other Parts joyn'd to them, from whence neceſſarily follows an Inflammation. Or elſe the Conglutination and Contraction of the Veſſels is the effect of the Inflammation, as all thoſe obſerve who have open'd many Bodies. Likewiſe we ſee after a *Pleuriſie* that the Lungs ſtick to the *Pleura*, at the place where the Inflammation happen'd, in the ſame manner after great and frequent Injuries of the Belly, the Guts ſtick together, and ſometimes adhere to the *Peritonæum*.

Or we may obſerve that the *Fallopian Tubes* do not cloſe or ſtick together, only towards their entry from the Womb, but are curbed alſo towards their Extremities, which are more Open. That which I have occaſion to obſerve is in a certain Woman who being taken in Labour the fourth time, and ſuffering a great deal by reaſon of the difficulty of her Delivery, or rather more from being aſſiſted with an ignorant Midwife, who pull'd away the *Afterbirth* too forcibly, it being ſtrongly fixed to the Womb, ſhe perceived or felt great Pains at the bottom of her Belly, eſpecially about the Kidneys, which continued Fifteen Days together, as if it would have kill'd her, without hopes of Recovery. But being very ſtrong and able to undergo the Pains, ſhe happily eſcap'd contrary to the Expectation of the World, after the neceſſary Remedies, and lived Ten Years after that. She felt continually a great Weakneſs upon her Reins, and from that time was Barren.

This Woman dying, and having accidentally an occaſion to be opened to enquire into the Cauſe of her ſudden Death; I found then that the occaſion of her Barrenneſs proceeded from hence; namely, the Conglutition, Sticking together, or Contraction of the curled extremity of the *Tubes*, cauſed by Inflammation upon the adjacent Parts of the *Matrix*, after the laſt difficult Labour, in which ſhe had been ſo ill treated.

It appears evidently from this Caſe, and by the like, how pernicious it is in a difficult Labour, to make uſe of ignorant or unexperienced Midwives, Phyſicians or Surgeons, ſince thoſe who ſurvive the Operations of ſuch, ſo commonly ſuffer by Accidents of this Nature, and what is more miſchievous they accompany them to their Death-beds. Beſides, this ill treatment in Deliveries leaves yet another fault in the *Tubes* which hinders the curled part from joyning to the *Ovary*, ſo that the Eggs cannot deſcend into the *Matrix* to wit, the *Paralyſis* of the moving Fibres which externally embrace the *Tubes*, and which ſerve for the Periſtaltick Motion. This inconvenience, I ſay, is eaſily produced by the Cauſe, I have mentioned, to wit, when the Nerves cloſe and become uſeleſs in performing their Functions in the Part where the Inflammation is preſent.

After having diſcover'd the Cauſes which makes the *Fœtus* ſometimes lodge in the *Tubes*, and not proceed into the *Matrix* or Womb; it remains to examine how the *Fœtus* is faſten'd with the *Placenta*, from the internal Tunick or Coat of the *Tubes*, and how it gains its growth from thence after the ſame manner as it doth in the *Matrix*. To underſtand this the eaſier, I propoſe firſt of all, my Opinion of the Manner, how it is performed in the *Matrix*, and afterward I ſhall let you ſee the Analogy that there is betwixt the Womb and the *Tubes*; ſo that you may clearly know how the *Fœtus* grows in the *Tubes*. After ſo many great Men have endeavoured to explain and clear up the Generation in an Egg, and that they have ſufficiently demonſtrated it: It is not likely that there ſhould be any room for doubt ſince it is certain that the *Fœtus* in the Egg is puſh'd out of the *Ovary* by the *Fallopian Tubes*, into the very Cavity of the *Matrix* having along with it all the Parts finiſhed and incloſed with its Membranes and the *Placenta*, which ought to ſtretch and extend themſelves according to the firſt *Idea* and in the firſt Formation, and that afterwards being deſcended it remains there, and takes its growth: Or there is a probability that the growth of the Egg proceeds from the ſame place to which it is faſten'd, whether it be to the *Matrix*, or the *Tubes*; ſince this Egg contains nothing in it ſelf ſo much of the Subſtance, which is neceſſary for the Nutrition of the growing *Fœtus*: Of which we ſee every day the contrary in Animals that are

e made properly from Eggs, which contain much room in them as is neceſſary for all e Matter that is made uſe of for the growth the Chicken incloſed in the Shell: That e *Fœtus* then may receive from the *Matrix* e Humours that are neceſſary for its owth; it ought to be faſten'd, or rather it were glewed to it, in ſuch a manner at there be form'd from thence ſmall Pipes Veſſels, which coming from the *Womb* or *ta*, the Humours and Blood may be com-unicated backwards and forwards, from e to the other.

It may appear difficult to explain how is adherence is made, or how this gluing gether of the *Afterbirth* with the *Matrix*; t I ſhall in few words give my Opinion this Matter: We have ſeen by experience t after the Eggs have remained ſome days e and moveable in the Womb, without ng faſten'd, their outward Surface, eſpe-lly at the part of the *Afterbirth*, becomes iry, and is made up of ſmall floating Fi-ents, that are like very fine Moſs; theſe Threads that preſently adhere to the face, are moiſten'd by the Humidity con-ed there, and unfold or ſpread them-es when the Egg is come at a place where e is more room, to wit, in the Cavity he *Matrix*. I think that theſe Fila-nts ought to be taken for the ſmall Pipes ſerve to receive an Humour, as the ll Fibres that are in the Roots which ey the nutritious Juice of the Earth to Body of a Plant or Tree: Elſe theſe s or Veſſels ſerve neceſſarily to receive Humours that are naturally ſeparated in nternal and glandulous Surface of the *rix*. But this happens particularly n the Egg is come by the internal Mo-of the Humours to that paſs, that it t up, and of ſuch a Size, that it com-s the adjacent Sides of the Womb, the internal Cavity of it, is not ordi-y larger than a great Bean. It happens this reciprocal bearing upon one ano-which is done with ſome Compreſſion he external Surface of the Egg, which were peeled or bare, ſticks or hangs to the internal Surface of the *Matrix*, pecially to the part of the *Placenta* or *birth*, and that a part of the Pipes or which are in the Egg, to wit, of thoſe which are neceſſary for this purpoſe u-nite themſelves, with the ſeparating Veſſels of the Glands, whoſe internal Coat is de-rived from the *Matrix*: From whence it happens that their Conduits become conti-nued after the ſame manner as we ſee other parts are united together; as for Example, the Cheeks with the Gums, when one or other of them are Ulcerated. But it would be needleſs to waſt more time in proving a thing that appears ſo clear from ſeveral Ex-amples of the like Nature. We may ſup-poſe that theſe Filaments or ſmall Pipes in-ſert themſelves into the Veins of the *Pla-centa*, which are afterwards form'd into the umbilical Vein, in the ſame manner that the Lymphatick Veſſels which, by the ob-lique Pores without and within, enter into the Veins, and convey all the Humours that are in the Trunk of our Bodies. For it is certain that all theſe Humours that are thus ſeparated return into the Maſs of Blood: Likewiſe the *Lympha* which continually flows from the internal and glandulous Sur-face of the *Peritonæum* to facilitate by that the Motion of the Parts therein contain'd, and to hinder that they unite not, or ſtick together, returns into the Veins that are diſperſed through the whole, into the Ca-vity of the lower Belly, and upon the Sur-face of the Membranes; and when theſe Conduits or Veſſels are ſtop'd, we regard it as the common Cauſe of a *Dropſie* call'd *A-ſcites*. 'Tis after the ſame manner, that the *Lympha* which is ſeparated in the glandu-lous Membranes of the Brain, and which is contained in the Ventricles and Interſtices enters again into the Blood. 'Tis the ob-ſtruction of this return that a *Hydroce-phalus* is incident to Infants, becauſe they ſuffer a great Dilation, from the ſtoppage of the *Lympha* in the *Interſtices* of their Mem-branes: But in Perſons of an advanced Age whoſe *Cranium*'s are not ſo ſubject to Exten-ſion, when the Circulation of the Blood is impeded, there happens a Mortal and incu-rable *Apoplexy*: The Brain is found com-preſs'd by the too large quantity of this Li-quor: In ſhort we may from the ſame way of reaſoning, trace the cauſe and Origine of moſt Diſeaſes.

In the 3d Figure we may ſee the *Tubes* with the Womb of a very extraordinary

Size.

Size, and the ſpermatick Veſſels form'd after an unuſual manner, with double Ureters. I ſhall give the Hiſtory of this caſe in as few words as I can, and only what relates to our purpoſe. The Daughter of a certain Burgeſs, of a moderate Fortune, was married with a Gentleman: But the inequality of her Condition being made known to her Husband's Friends, they obliged him to forſake her, ſo that ſhe was obliged to live at *Amſterdam* for ſome Years, accompanyed with Melancholy and Poverty. After ſome time the Husband return'd, and going to ſee her, he promis'd to reſtore her to her former State: Upon the new Careſſes of her Husband, this Woman grew big with Child, and ſhe was confirmed the more daily in that Opinion by the ſwelling of her Belly, and the Suppreſſion of her *Menſes*. Nevertheleſs the Husband's Parents hearing of this, made him change his Deſign, and ſo alienate himſelf from her, as never to ſee her again. This laſt abſence of her Husbands, or rather this abandoning her, being much rougher than the former, ſo afflicted the poor Woman, that during all the time of her pretended Gravitation, ſhe remained perpetually Sad, and Melancholy being fill'd with Grief. In ſhort, after Nine Months were gone there was no Birth; nevertheleſs the Midwife who came to ſee her, believed her to be effectually with Child, although ſhe never felt the Motion of the Child, aſſigning for reaſon that the *Fætus* was affected as well as the Mother, and that it was the weakneſs ariſing thence, that hinder'd it from ſtirring or turning it ſelf. After ſome time was gone and there was no Delivery, they believed it was a *Dropſie*, and for two years together took Medicines againſt the *Dropſie*, but to no purpoſe. When ſhe was obliged to keep her Bed, and that the Size and Tumour of the Belly grew frightful, I was ſent for to make the *Paracenteſis*. But having ſeen this Woman in ſuch a Condition I wou'd by no means undertake the Operation, having always been of opinion that it was Raſhneſs to attempt the Operation of the *Paracenteſis* in a confirm'd *Dropſie*.

The Woman dying ſome days after, I opened the Body, and found a little or no quantity of Water in the Cavity of the *Abdomen*, all that prodigious Tum or Swelling being nothing but one of *Tubes* of the Womb extraordinarily Inf and Big, which contained 150 Pints of ter, that were taken thence: But for better examining of the whole with exactneſs, I carried this Tumour wit *Matrix* joyn'd to it, having leave gra me, Home; whereof I cauſed a Figure drawn by the Life, and have given y Deſcription along with it. The Mem nous Subſtance of this *Tube*, after the W was taken out, weigh'd above 30 Poun

One part of this *Tube* we may take a of in the 4th Figure. It appears of va kinds of Subſtances, to wit, *a*,*a*,*a*, are *Car nomatous* Tumours form'd of a matter cont in the Glands of the *Tube*, for we kno other difference betwixt a Scyrrhus, C rous or *Carnocinomatous* Tumour, and ther Tumour which degenerates into an ſceſs, but that the Matter which make Cancer is a Liquour ſeparated and con ed in the Body of the Gland, withou ing mix'd with any other Humour the obſtruction of the Veſſels which f for the ſeparation of that Liquor, by w it encreaſes continually, and not flo by reaſon of the hardneſs of the Mem which incloſes the Gland, ſo that findi other Way or Paſſage to return int Blood it cannot reſolve, but thicken makes the Gland Harden, and conſeq ly cannot give room to digeſtion or d ting the Matter that is contained the from hence it comes there is no *Pus* for it never changes its Subſtance; *b*, is the *Lympha* into the Belly, which parated in the Glands of the *Tubes*.

Before we leave this Story, I deſig give you my Opinion upon the cauſe extraordinary ſize of this *Tube*: I do diſpute this Woman's being gone Child, and that the *Fætus* was not ſto the *Tube*. But the *Fætus* being Dead Blood is carried in great plenty to that Part, and the Veſſels being fou ſome meaſure much Dilated, there is Motion of the Blood towards the G where the internal Tunick of the ſpread throughout the whole, by means there is made a continual ſepar of the *Lympha*; which, in ſhort, pro

Fig: I

The Fœtus as t
the Operati

A

E

B

g

b

c

V863 pag:325.

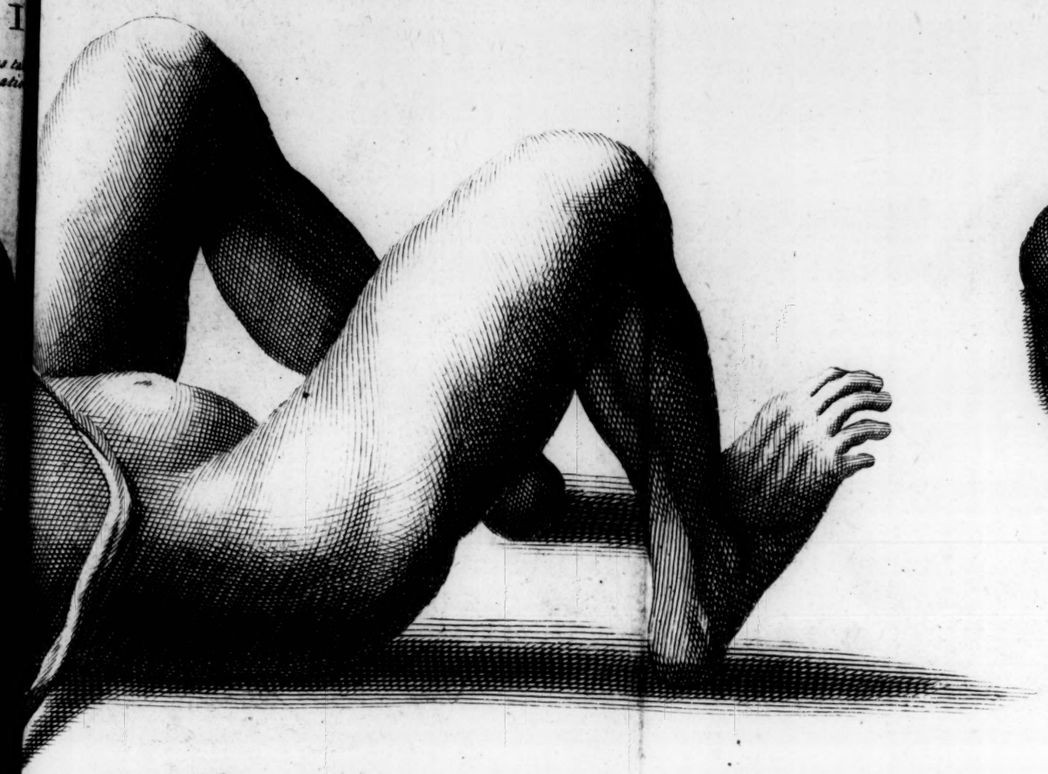


Fig: III.
Fallopian Tubes full of Water, &c.

A. The bottom of the Womb.
B.B. Fallopian Tubes.
C.C. The extremities of those Tubes clos'd.

Fig: II.

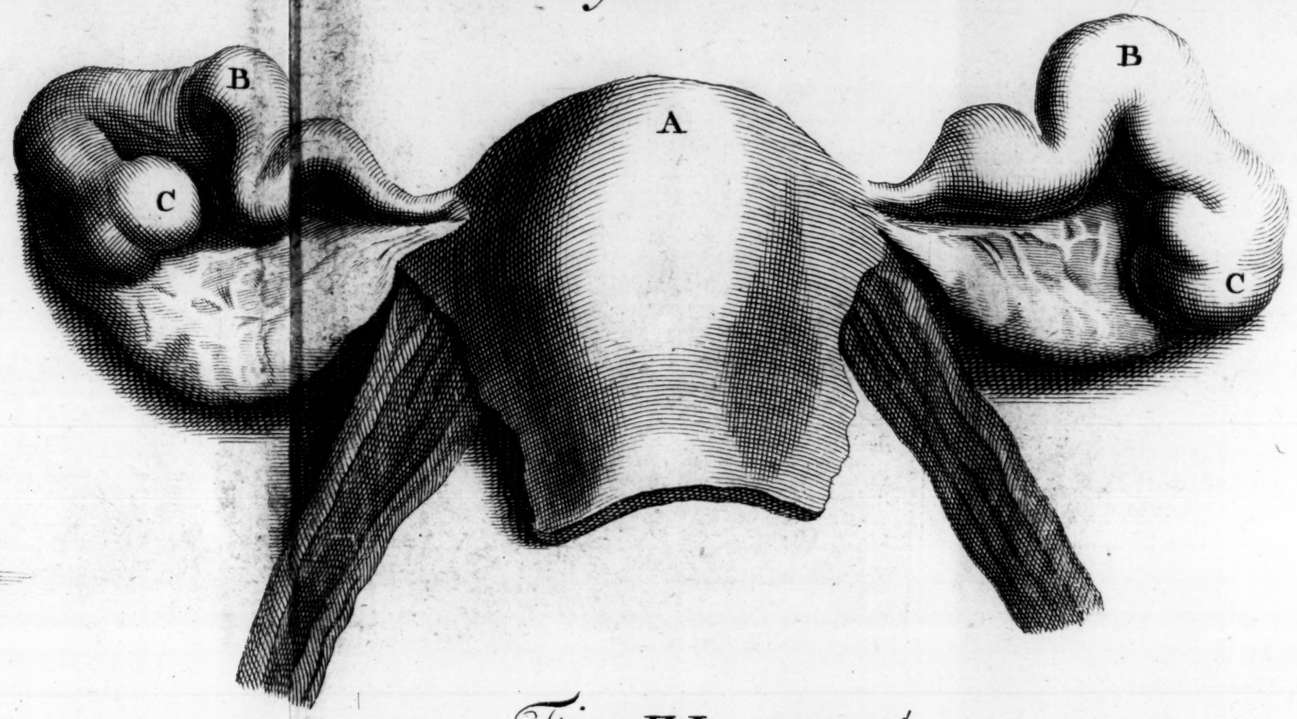
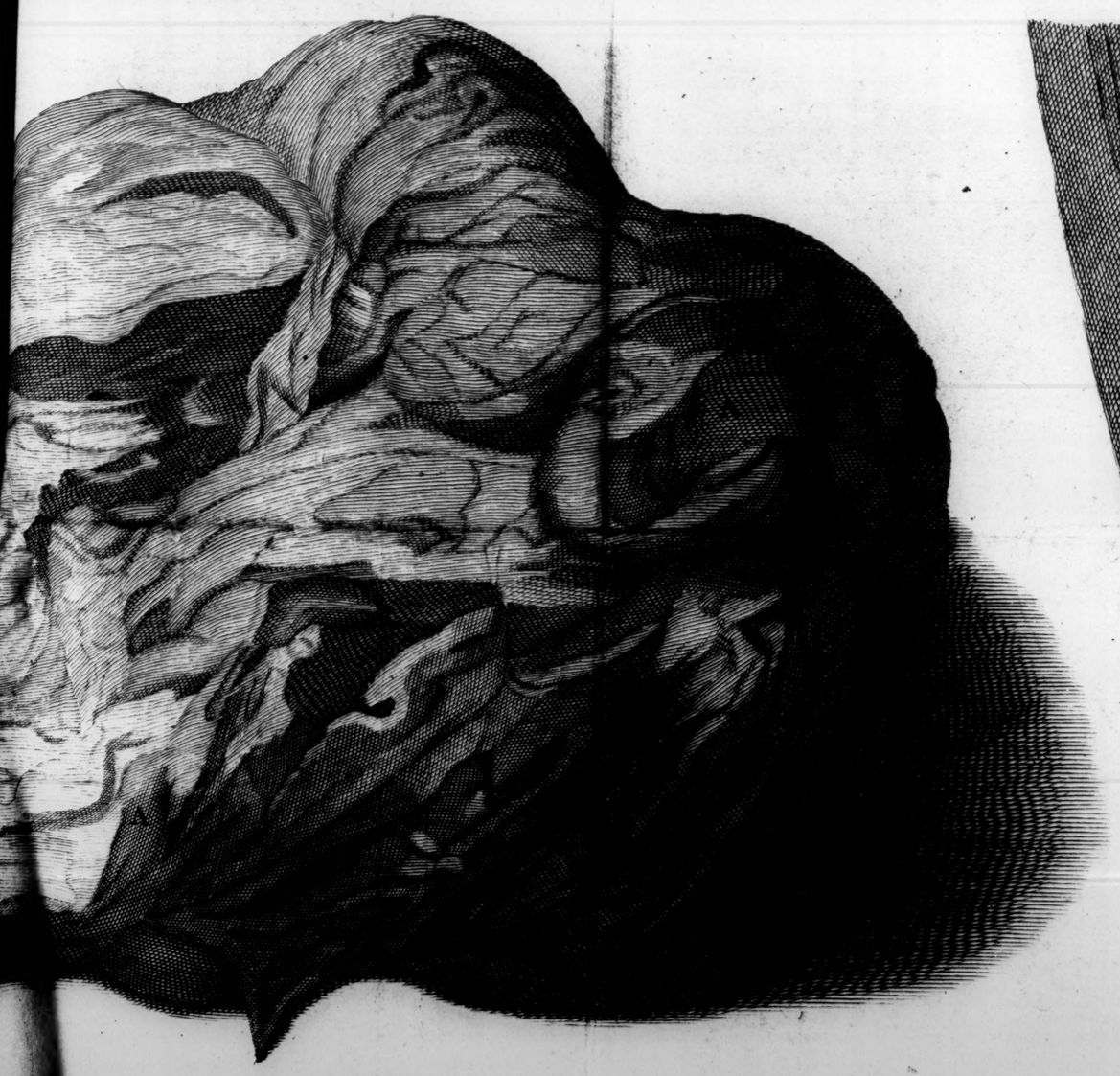


Fig: IV *is explain'd by the* 3*d.*



this *Dropſie* of the *Tube*, by reaſon that this *Lympha* cannot find any Road to re-enter into the Blood, and that the Inſertion of the *Tube* into the *Matrix* was ſhut up; which is ſeen in the third Figure, where the *Matrix* appears cloſed on the ſide of the *Tube*.

The firſt Plate or Figure repreſents the Fœtus *as it appear'd in the Operation.*

A. A. The PARTS excoriated.

B. The Navel-ſtring dry'd.

E. The After-birth.

The ſecond Figure is explain'd in the Copper-Plate.

The third Figure.

A. A. A. The right *Fallopian Tubes* full of Water.

b. b. The two *Cavities* of the *Matrix*.

c. An *Iſthmus* betwixt the two *Cavities* of the *Matrix*.

d. The Internal Orifice of the Womb.

e. The left *Fallopian Tubes* which are betwixt the two *Cavities* of the *Matrix*.

f. The Bladder.

g. g. g. g. The *Ureters* double on each ſide.

h. h. The Spermatick Arteries.

i. i. The Spermatick Veins.

l. The Spermatick Vein coming from the Kidney.

Of Fevers in General; *From* D. Gagnon Sieur de Saintigny, *Mr.* Chaillon, Wallis, Morton, Sydenham, Carleton, *and others, the moſt Famous Phyſicians of the laſt and preſent Age.*

IT is the Cuſtom of *Mathematicians*, when from a Series of propoſitions, premiſed and verified they have inferred the Concluſion they ſought, to add certain uſeful *Theorems*, called by the *Greeks* πόρισμα or *Corollaries:* The knowledge of which is many times of equal Moment with that of Verity, on which they depend. Give me leave then ſo far to imitate this Method of thoſe great Maſters in the Art of reaſoning rightly, as to lay down a few *Pathological Corollaries*, ſuch as may perhaps afford ſome glimpſes of Light toward the Diſcovery, Nature and Cauſes of a certain Diſeaſe, which is of all others incident to Mans frail Body, the moſt common, moſt grievous and moſt dangerous: For the ſubject of this preſent Tract is not only a Speculation, but tends to the finding out the moſt probable cauſes and reaſon of curing the ſaid Diſeaſe, as the principal ſcope and end of all our Enquiries, as well *Phyſiological* or *Anatomical*, of which none can be ignorant who hath peruſed that little Book of *Hippocrates de Priſca Medicina*, wherein he teacheth, that it is the great Duty of all Phyſicians, who deſire to render themſelves worthy of that honourable Appellation not by diſcourſe alone, but alſo by their Works, and ſuccouring of the Sick, to be ſolicitous about inveſtigating the true Nature, Cauſes and Remedies of Diſeaſes, above all things.

Nor is it new to find in the Writings of Anatomiſts, Pathological Reflections ſubjoyn'd to the deſcription of the Part, which is known to be the primary Seat of the preternatural Affections incident thereunto. I ſhall therefore premiſe this, that the vital Heat or Motion of the Blood doth formally conſiſt in a certain expanſive Luctation of the ſpirituous Particles thereof, with the leſs moveable or unactive, repulſed and prevailing alternately; but mild, amicable benign, and conducing to the exaltation of all the Faculties and Uſes of the Blood. Now I come to add that it is not only poſſible, but that it often happens, that this Vital Motion, although proceeding only from the Spirits that conſerve and rule the Blood, is by cauſes beſide the inſtitute of Nature invading it, *perturbed*, *interrupted*, *perverted*, and ſometimes alſo wholly *extinguiſhed:* The vital Oeconomy being thereby ſooner or later utterly ſubverted. Of this we have inſtances almoſt innumerable. Nor is there any one kind of preternatural Cauſes aſſignable, by which Nature may not be impeded in her production of this Vital Motion, and more or leſs Perturbed: As we cannot but obſerve it within our ſelves to come to paſs, ſometimes from the immoderate Heat of the Air ſurrounding us, as in *Ephemera*; ſometimes from Meats and Drinks potentially too Hot, as in Surfets and Drunkenneſs; ſometimes from vehement Paſſions of the Mind, as in Anger, Fear, Grief, *&c.* Sometimes from a fermentation of the Blood, as in putrid Fevers; ſometimes from venenate *effluvia* of Bodies, as in peſtilential and contagious Fevers; ſometimes from a ſimple Solution of continuity of the Parts, as in Wounds: So that

that in Fine, to enumerate all the various Cauſes, by the Hoſtility of which this Life-conſerving Work of the Vital Spirits, may be hindred and perverted, is a thing extremely difficult, if not plainly impoſſible. But in all theſe ſo various Caſes, this is worthy to be Noted, as a general Verity; that the Vital Spirits of the Blood are always *preternaturally* Affected, and that the diſorder from thence Emergent, ought to be imputed to a *preternatural* Cauſe. Every thing then that *pollutes* the Blood, and that puts Nature to an Effort or Eſſay to ſeparate and eject from thence, as Alien and Hoſtile; is wont more or leſs, according to the diverſity of its Nature and Malice, to impugn and repreſs the Vital Motion of the Blood. But nothing hath been obſerved to do it, either more frequently, or more contumaciouſly, than *impurities* ariſing from *Crude Humours* congeſted in the Maſs of Blood, which cannot be ſeparated and extirpated without previous Concoction or Digeſtion. For, theſe conſtituting a certain peculiar *Inquinament* or Pollution of the Blood, put on the Nature, and acquire to themſelves the efficacy of a *Ferment*; not indeed ſuch as the Leven of Bread, or as the Yeſt of Ale or Beer; but ſuch, that being in our Bodies mix'd with the Blood, which perpetually conceives new Vital Heat in it ſelf, produceth the like Commotions therein, that thoſe domeſtick Ferments do in their reſpective Subjects; and may therefore be not unfitly called a *Ferment*, according to the Name given to it by all Modern Phyſicians.

For, it cauſeth a manifeſt Tumult, or inteſtine War in the Blood, after this manner. The *inquinament* of the Blood, by reaſon of the Crudity and Viſcidity of its Parts, impugns and hinders the benign expanſive Motion of the Spirits, in which I have declared the Generation of the Vital Heat of it to conſiſt: And the Spirits, on the contrary, by their natural tendency to expand themſelves, oppoſe that repreſſive Force, and ſtrive to defend themſelves from Oppreſſion; producing by their Energy, a continuation of the Mication of the Blood, imperfect indeed, and mix'd with Fermentation, but the beſt they are able, till they have gained the Victory, to produce. So that the Fermentation of the Blood in Fevers, ſeems to proceed, not from the impurities mix'd with the Blood alone; but partly from them, and partly from Nature, *i. e.* from the Vital Spirits conſerving the vitality of the Blood. For, while *theſe* are impugned, check'd, and hindred, by *thoſe*; the Motion reſulting from that Conflict, is indeed a certain Mication of the Blood, but Tumultuous, violent, unequal, and interrupted with little Bubles and Froth. I ſay therefore, that this Civil War in the Blood, as it includes a certain Vital, though imperfect and irregular Mication of the Blood; cannot be denied ſo far forth to be the Work of Nature: But as that Mication is ſuppoſed to be Tumultuous, Seditious, Hoſtil, and unequal; it muſt be, in that reſpect, the product of the Fermentation ariſing from the Inquinament or Corruption of the Blood.

This *Fermentation* certainly is the very ſame thing that the Ancient Phyſicians meant by the *Putrefaction* of the Blood in Fevers: Calling, for diſtinction ſake, all ſuch Fevers, which they conceived to ariſe from thence, *Putrid* Fevers. For it is not credible, that Men of ſo acute Judgment, and ſo curious in obſerving, and their Writings declare them to have been; by the Word *Putredo*, intended to ſignifie that ſordid and noyſom Corruption obſerved in dead and rotting Carcaſes, which is abſolutely inconſiſtent with the Principles of Life; but only a more mild manner of Diſſolution of the Blood, and ſuch as doth impugn and hinder, but not wholly ſuffocate the vital Expanſion of it. And of this we are certain, that they uſed to affix the Epithet, *Putrid*, to whatſoever doth by a ſwift Motion degenerate into the Nature of *Pus* or *Quitter*. Which is generated, either ſlowly, by degrees, by a gentle and long proceſs, and alſo without Tumult; as when any Humour is, without a Fever, digeſted and converted into purulent Matter: Or ſpeedily, and with great Tumult and diſorder of the State of the Body; as in putrid Fevers, when the *Materia Febrilis*, or inquinament of the Blood haſtens to Concoction, and the Diſeaſe runs through all its Times quickly and ſwiftly. Of theſe two ſo different ways of producing Purulent Matter in the Body, the *former*, which

is always ſimple and without a Fever, is called by the Antients, πεπασμὸς, *Maturation* or *Ripening* of the Matter: The *Later*, which is always with a Fever, is called Σαπρεία & σαπρότης, *Putredo*. Whence that Aphoriſm of *Hippocrates* (*lib.* 2. *aph.* 47.) *Dum pus conficitur, dolores atq; febres incidunt magis, quam jam confecto.* In their Senſe therefore, *Putredo*, is the very motion of the matter of a Fever tending to Purulency: And this Motion is the very ſame, that moſt *Neotericks* Name *Fermentation*. For, in Fevers, it is the Fermentation that brings the impurities to Digeſtion or Concoction, and diſpoſes them to ſeparation from the Blood: And therefore the *Putrid* Matter, and the *Fermenting* Matter ſignifie one and the ſame thing; and by conſequence, the *Materia Febrilis*, and *Fermentum Febrile*, are but two different Names of the Cauſe whence the Fever or Fermentation of the Blood comes. Now if this be granted to be conſentaneous to Reaſon and Experience (as to me it ſeems to be) we need no longer amuſe our ſelves with inquiring, either wherein the formal reaſon of a putrid Fever conſiſts, or how thoſe two Enemies, *Life* and a *Fever* can ſubſiſt together in the ſame Subject, the Blood; for what I have ſaid may ſerve to expound both thoſe Riddles.

Confiding therefore in the firmneſs of this Foundation, I deſign to erect thereupon a ſhort *Theory*, of the Nature, Cauſes, Differences, and principal Symptoms of *Fevers*; and that according to the *Model* left to us by that moſt accurate Surveyor of Nature's Works, Dr. *Fr. Gliſſon*, in his laſt incomparable Book; reputing it well worth my Diligence, to paraphraſe upon the Text of ſo great an Author.

And becauſe to Phyſicians accurately inveſtigating the differences of preternatural Cauſes inducing Fevers, there occur to be conſidered more than one Kind, as of *Crudities*, ſo likewiſe of *Ferments*; that I may not leave my ſelf ſticking in the ſhallows of Ambiguities, 'tis requiſite that I clear and diſtinctly explain; firſt what I underſtand by *CRUDE HUMOURS* commix'd with the Blood. Which I take to be generally the *Material* Cauſes of putrid Fevers; and then what I mean by the *Fermentum FEBRILE*, which I ſuppoſe to be the *Efficient* Cauſe of them, for by this means, the Fog of Equivocations being diſcuſſed, we ſhall by a clearer light of diſtinct Notions contemplate the Nature of the Things ſought after.

As to the *Firſt* thereof, *viz.* the *Crudity* of Humours; 'tis well known, that Phyſicians obſerving two kinds of *Concoction* or Digeſtion performed by Nature in the Body, *viz.* One of what is *Natural* and Familiar, of the *Aliment* requiſite to the continual Reparation of the Body; which they call πέψις, the other, of what is *Preternatural* and Hurtful, as the material cauſe of Diſeaſes; which is named, for diſtinction ſake, πεπασμὸς: Have accordingly conſtituted two ſorts of *Crudity*, one *Alimenti*, the other *Inquinamenti*. Of which the *former*, that reſpects Nutrition, is ordinary; ariſing for the moſt part from ſome error committed in the uſe of the ſix Non-naturals, and conſiſting chiefly in this, that the Spirits of our Food are either not ſufficiently excited, or if excited, yet not ſufficiently tamed and ſubdued by the concoctive Faculty of the Stomach, to ſerve to promote the vital Mication of the Blood.

The *Later*, viz. *Cruditas inquinamenti*, is in the general, any pollution or corruption of the Blood whatſoever, ariſing from defect of its due preparation and fitneſs to admit the vital Mication. And this, being the Mother of Fevers, is that intended by *Hippocrates* in that moſt remarkable Aphoriſm; *Concocta medicamento purgare ac movere oportet, non cruda.*

This Crudity is ſubdued into two ſorts; one *Simple*, which conſiſting only in defect of due preparation of the Blood, may be corrected *per pepaſmum* or maturation, neceſſarily previous to Evacuation either Natural or Artificial: The other *Malignant*, which always includes certain ſeminal Reliques of ſome precedent form of the Matter mix'd with the Blood, hightly hoſtile to the vital Spirits, and incapable of Correction or Mitigation, and many times of Expulſion. Now from this Malignant Crudity of Matter mix'd with the Blood, ariſeth a *Malignant Fever*; and from the ſimple Crudity, comes a *Putrid*. Of both which

e ſhall ſpeak more Copiouſly, when we me to conſider the *differences* of Fevers.

As to the *Second*, viz the difference of *rments* incident to our Bodies; I Adver-e, that they alſo may be (as to my preſent iſquiſition) commodiouſly referred to two inds. Of which the *one* may be called *rmentum irritans*, becauſe it doth primari-, by it ſelf, and directly irritate the vital pirits of the Blood, to begin an extraordi-ary Commotion, and ſeditious Tumult, ith the groſſer Parts of it; and to endeavour deliver themſelves from Confinement, and diſſolving the common Bond of the whole aſs thereof, to fly away. And under this ind are comprehended all fermenting Mix-ures abounding with ſaline Spirits, highly olatile, and not eaſily tameable by the di-eſtive Faculty of the Stomach: Among hich the *Stum* of Wine is Eminent.

The other deſerves to be named *Fermen-um Opprimens*; becauſe it at firſt and im-ediately oppreſſes the vital Spirits of the lood, impugning their expanſive Motion; hough afterward, ſecondarily, and by Ac-ident, it irritates them to a *Pneumatick* Fer-entation; not to diſſolve the whole Mix-ure thereof, and ſo to make way for them-elves to fly away: But only to attenuate, iſcuſs, eject and exterminate the Ferment, hat by clogging and oppreſſing them, hin-ers their ſpontaneous Expanſion, and the ital Mication of the Blood thereon depend-ng. And this to me ſeems to be that kind f Ferment, by which a Fermentation of he Blood is wont to be excited in putrid evers; and which for that very Cauſe, ught to be nominated *Fermentum Febrile*. t ſeems alſo to conſiſt of any crude Hu-our whatſoever commixt with the Maſs f Blood. For, this doubtleſs is that *Cru-ity*, which *Hippocrates* (in the newly cited phoriſm) forbids to Be importunately at-mpted by purging Medicaments, until Na-ure hath mitigated, tamed, and prepared for Evacuation, by gradual Digeſtion.

Of which Counſel, though many reaſons ave been, by the learned Commentators on is Aphoriſms, chiefly by *Cardan*, alledged; et the moſt credible, and therefore the oſt conſiderable ſeems to be this; *That Na-ure hath provided no Organs for the Sparation or Secretion of ſuch Crude Humours from the Blood, the Spirits of which are not yet exhauſted.*

Moſt true indeed, and evident it is, that Nature has with admirable Wiſdom and Providence taken care to preſerve the Blood Pure and Undefiled; and to that end fra-med, and moſt advantagiouſly placed three conſpicuous *Secretory* Organs, for the puri-faction of it, *viz.* the *Liver*, *Kidneys* and *Stomach*, with the conjoin'd *Inteſtines:* And yet it is no leſs true, that none of theſe is, by her primary Inſtitution deſtined to ſepa-rate and drain from the Maſs of Blood, any Matter yet remaining in the State of *Crudity*, or not yet deſpoil'd of its Spirits; but all three ordained, leſt the Blood, after it hath ſpent and conſumed the ſweet and profita-ble Spirits of the Aliment, and becomes thereby Effete and Ungenerous, ſhould be longer detained in the Body; and like a dead Body bound to a living, pollute and infect the Blood newly made of a Chyle lately im-ported, and repleniſh'd with ſweet and uſe-ful Spirits.

Now the Humours here by us ſuppoſed to be both the antecedent and conjuct Cauſes of Fevers, are not ſuch as have already been ſpoiled of their Spirits, and apt to turn Vap-pid; but ſuch as abound with Spirits yet Unvolatilized, and infeſt to the vital Mica-tion of the Blood. For, the Matter not ſuf-ficiently digeſted, altered, and elaborate in the Stomach, becomes at length apt to pro-duce Fevers, in this reſpect only, that the Spirits contained in it, are either not ſuffi-ciently Excited, or not ſufficiently ſubdued and tamed. Likewiſe the Matter that grows crude, and apt to generate Fevers, either from defect of due Eventilation, by inſen-ſible Tranſpiration, or from want of free Mo-tion, is not Vitious, becauſe the Spirits of it are already diſſipated, but only becauſe they are, contrary to the inſtitute of Nature de-tained, and becauſe they at the ſame time impede and ſomewhat ſuppreſs the vital Mication of the Blood. In fine, the *Semina Heterogenea*, unalterable reliques of ſome precedent form remaining in the crude Mat-ter commix'd with the Blood, cauſe a *Ma-lignant* Fever; becauſe the Spirits of that matter have been already Exhaled, but be-cauſe they are Hoſtile, highly inſenſe and

per-

pernicious to the vital Spirits, and incapable of being tamed. We have Reason then to believe, that the material Causes of Fevers are not the dead, useless and excrementitious Parts of the Blood; not the *Phlegm*, not the *Bile*, nor that thin Humour consisting of the *Serum*, Salt and Tartar of the Blood, which is separated in the Kidneys; for all these have their peculiar *secretory* Organs, by which they are daily separated and carried off: Nor do they require any other Preparation to their Separation, but what consists in their Transmutation into those Humours *in Specie*; which is done only by the gradual *Deflagration* of the Blood, by which the vital Heat is sustained. For hence it is, that in Tract of Time the nobler Parts of the vital Juice are dissipated and consumed, and the remaining Parts, which they had before kept united, divided into various Parties, and becoming excrementitious, pass some into *Bile*, some into *Phlegm*, and more into the Matter of *Urine*; and all these now unprofitable Humours, being brought together with the Blood to the respective Organs in which they ought to be separated, are there by way of Percolation secern'd, and by their proper excretory Vessels carried off and ejected.

If this be admitted for true, What then are we to think of the long-lived and even to this Day flourishing Doctrine of the *Ancients*, that attributes *Tertian Fevers* to *Choler*, *Quotidian* to *Phlegm*, and *Quartan* to *Melancholy*?

I answer, (with Dr. *Glisson*, who in all Arguments endeavour'd, as far as his Devotion to Truth would permit him, to sustain the Authority of the Ancients) that those Humours were, or at least might be taken, either for the *Reliques* of the stale and vapid Blood, or for Humours *analogous* to them.

The *Reliques* of the Blood are (as was just now said) resolved into *Bile*, *Phlegm*, and *Urine*; in the last of which are contain'd four other Kinds of Excrements, *viz.* the *potulent Matter*, *Salt*, *Serum*, and a certain earthy *Liquamen*, commonly distinguish'd by the Name of *Tartar*. But as for *Melancholy*, no Place is to be found for it among the Reliques or stale and rejected Parts of the Blood: For in the whole Body we find no peculiar Organ provided by Nature for the Secretion, Reception and Exclusion, of a such Humour; and therefore, saving Respect and Veneration due to those Fath of our Art, the Interest of Truth, which still more sacred and venerable, obliges to affirm, that they erred most egregiou when they assigned that Office to the *Splee*

The Humours *analogous* to the newly e merated Reliques of the Blood are signif by the same Names. In particular, the v cid, insipid and white, Part of the Blood called *Pituita* or *Phlegm*; the hot, dry, ac monious, and pungent or corroding, *B* or Choler; the cold, dry, blackish and adu *Melancholy*, if at least any such Humo may be admitted to lie conceal'd in the M of Blood: For, we must confess, we usu more than a Physical Licence, when we c this an analogous Humour, to which n thing that holds any the least Resemblan or Analogy can be any where in the wh Body found: And yet nevertheless it m be lawful to say, that the Analogy th some Parts of the Blood seem to have to th fictitious Humour, which the Ancients im gined to be separated and received by t Spleen, may serve to excuse us, if (out Compliance with Custom and the vulg Doctrine of the Schools) we retain the D nomination, while we rectify the Notio of Melancholy. For though the *Analogat* be wanting, yet if in reality a Thing r spondent thereto hath Existence in Natu the suppos'd Analogy is enough to justi the Appellation.

Considering this, I assert, that in the M of Blood are most commonly contain 1. A sharp, pungent or corrosive *Serum*, su as is wont to be cast out by Exsudation an *Erysipelas*, and in the little Bladders Blisters rais'd by Epispastic Emplasters, whi answers to the *Bile* or *Choler*; 2. A whiti and fibrous *Grumus*, that resembles *Phlegm* 3. A duskish or blackish and friable *Grum* comparable to the *Melancholy* of the A cients; for other Humour that may deser that Name, there is none to be discern'd the Blood.

Now, that we may see how far these E ments or constituent Principles of the Blo can be brought to consist with the Humou of the Ancients, let us equitably compa these with those. According to their sev

Characters or Deſcriptions, the pure
natural *Serum*, by which, mix'd with
Lympha, the Blood is made and kept
d, ſeems to be the ſame with the natural
pure *bilious* Humour of the Ancients;
the ſame corrupted, and thereby grown
monious and corroſive, what they un-
ſtood by *Choler*, analogous to the *Gall*.
The white and viſcid *Grumus*, while un-
rupt and in a natural State, ſeems to
e with their natural *Phlegm*; when de-
erate and corrupt, with that morbifick
mour which they called *Pituita analoga*.
The black and friable *Grumus*, when pure
ſincere, is the *Humor ſanguineus* ſpecial-
o called, and that very Part of the Blood
ch, impregnate with vital Spirits and
nitrous Spirit of the Air, gives it a flo-
ed Colour; but deſpoil'd of thoſe Spi-
and receding from that ſcarlet toward
ey or black, (whence probably it re-
d the Name of *Melancholy*) is the *Me-*
ly they imagined to be like the Humour
e Spleen. This *Paralleliſm* being grant-
here ſeems to remain no Difficulty in
ciling the Doctrine of the Ancients
erning the Humours contain'd in the
d, with the conſtituent Parts of it now
ved by us; and by Conſequence, no-
hinders but theſe *analogous Humours*,
have diſtinguiſh'd and deſcribed them,
be the *material* Cauſes of putrid Fe-
yea farther, 'tis neceſſary that one or
of them be peccant in every putrid Fe-
which is what we ſought toward the
ſhing our preſent Genealogy of putrid
, without demoliſhing what the An-
have deliver'd of the ſame.

us then proceed to inquire into the
e of *malignant* Fevers, which ought
deduced from a certain Ferment of
er Kind, not yet deſcribed. For ma-
t Fevers being by their Nature always
pernicious than ſimply putrid, and
alſo contagious; it muſt be therefore
ey take their Original from ſome Fer-
more malicious, and more grievouſly
to the vital Motion of the Blood.
ment then, whatſoever we ſhall at
diſcover it to be, may juſtly be na-
the general *Fermentum malignum*, as
near to the Nature of *Poiſon* proper-
ly ſo called, about the Reaſon of whoſe fierce and pernicious Operation upon the very Principles of Life Phyſicians are ſtrangely divided in their Opinions. Omitting all which, I humbly conceive, that the deleterious or deadly Force of any Poiſon whatſoever doth conſiſt, not in any manifeſt Quality, but in ſome *ſeminal* Nature highly adverſe and deſtructive to the Mication of the Blood in Man, upon which his Life immediately depends. There are (I muſt confeſs) too many other Things, that with equal Speed and Cruelty break aſunder the ſlender Ligaments of Life, even by their manifeſt Qualities, if once admitted into the Stomach; as Fire, Oil of Vitriol, ſtrong Spirit of Salt, *Aqua fortis*, lixivial Cauſticks, Arſenick, Sublimate, *&c.* which, by reaſon of the extreme Subtilty and moſt rapid Motions of their Particles, and of their Force of penetrating, cutting, corroding and diſſolving, almoſt all Bodies to which they are applied, are as mortal as a Sword or Bullet; but all theſe, if they be ſufficiently *diluted*, loſe their fatal Vertue, and become innoxious; nor can they be rightly reckon'd among *Venoms*, no more than a Dagger or Halter, becauſe they deſtroy by manifeſt Qualities, and Ways evident to the Senſe. But *Poiſon*, whoſe Power is founded in a *ſeminal Nature*, ſecretly repugnant and pernicious to humane Nature, whether it be bred in the Body, or introduced by Contagion or otherwiſe, is always more or leſs noxious in a ſmall Quantity, and in a full Doſe deadly; ſo that 'tis dangerous to truſt to a Dilution of any ſuch Venom. And to this Kind are the *malignant Ferments*, of which I am now ſpeaking, to be referred; though ſome of them be more venomous than others, and ſome more contagious: For the *Malignity* of all ſeems to conſiſt in a ſeminal Nature, which (being communicated to the Blood) is apt to impugn, retard, oppreſs, and (when it prevails) totally extinguiſh the expanſive Motions of the vital Spirits that conſerve it.

Having thus concifely explained the formal Reaſons and diſtinct Properties of both Sorts of Febrile Ferments, the putrid and the malignant, that work immediately and *per ſe* by way of *Oppreſſion* of the vital Spirits; 'tis opportune for us to inquire into the

the Nature of them, conſider'd firſt *abſolutely*, and then *reſpectively* to the Manner of their Operation upon the Blood in generating Fevers.

I advertiſe therefore, that when I ſpeak of *Crude* Chyle brought into the Maſs of Blood, and by degrees inducing Putrefaction or Fermentation upon it, as I have briefly ſhewn in the Paragraph concerning putrid Humours, rendering the Blood impure; I do not call ſuch Chyle *Crude*, becauſe I think it wholly unfit to afford ſome Nouriſhment to the ſolid Parts, though Impure and Imperfect; but becauſe it is not ſufficiently concocted and prepared, ſo as that being united with the Blood, it ſhould be made the immediate Subject of the vital Spirits, or (which is the ſame thing) be impregnated with *Vitality*. Now Chyle in this ſenſe *Crude*, hath not yet attained to a degree of inquinament high enough to give it the Nature and Force of a *Febrile Ferment*; which ſtrikes at the very Root of the vital Motion or Heat. For it conſiſteth in a certain *Aptitude* to Infringe, Diminiſh, Retard, Oppreſs, and (if not overcome and expell'd by the Spirits of the Blood) utterly extinguiſh the vital Mication of the Blood, whence Life Reſults. For, conſentaneous it is both to Experience and to Reaſon, that this Aptitude is not acquired in a few Moments of Time after Crudities have been commix'd with the Blood; nor doth it actually attack the vital Spirits ſo ſoon as the Ferment is Diffuſed, but doth exert its Power ſlowly, by inſenſible Degrees, and as it were by creeping on, like an Enemy that deſigns to ſteal a Victory. Firſt it gently, and by little and little inſinuates it ſelf into the Maſs of Blood, and diffuſes it ſelf equally through all the Parts of it. Then it comes to be united with the Spirits that conſerve the Blood, as if it were a natural Ingredient of the Mixture. That done, if either the quantity or contumacy of it be ſo great, as that the vital Spirits be unable to moderate and reduce it to Conformity, or to expel and diſſipate it; it begins to operate, to weaken, and ſuppreſs them, affecting them with a kind of *Torpor*, and clogging them ſo as they cannot with requiſite Vigour endeavour to expand themſelves, and then the *Fever firſt invades*, ſhall be more fully Explicated, when come to examine the proceſs of Fermenta on in the Paroxyſm of an intermitte Fever.

In the mean time it follows to be inq red, wherein this Aptitude of the *Ferment Febrile* to fix the Spirits of the Blood, do chiefly conſiſt. I conceive with Dr. *Gliſ* that it is radicated in a certain *Lentor Clammineſs* of the Crudities mix'd with t Blood; Analogous perhaps to that Viſci ty obſerved in Wine and Beer not perfec fermented, which are therefore call'd *P dula*, or *Ropy*; nor can they be ever corre ed unleſs by a new Fermentation, wh exciting the oppreſſed and ſluggiſh Spir contained in the Liquor, and diſſolving Clammineſs of the groſſer Parts, quic clarifies it. For, what can be imagi more apt to Clog, oppreſs and fix the S rits of the Blood, ſo as to hinder their panſive Motion, than ſuch a pendul Clammineſs of Crude Humours diffu through the whole Maſs of it? I beli therefore, that the formal reaſon of ev Febrile Ferment in putrid Fevers, doth co ſiſt in ſuch a *Lentor* of the Blood. As that kind of it, that ariſes from defec Concoction in the Stomach, and that m therefore rightly enough be diſtinguiſhed the Name of *Crude Chyle*; it ſeems not firſt to be affected with the pendulous Cla mineſs here deſcribed, but only with a c tain Diſpoſition or Tendency toward it, reaſon the Spirits of the Chyle have not b ſufficiently excited and exalted from State of Fixation to that of moderate Fl ility, as they ought to have been: And this tendency may be ſufficient by degree induce a Clammineſs upon the whole M of Blood, when Crudities are daily incr ſed and accumulated, as commonly they before a putrid Fever is generated, Ot kinds of it are almoſt all derived, ei from Tranſpiration intercepted, or from travaſation of Humours, as in internal poſtems, and in the Dropſie; or from flammations and Tumours, where the co of the Blood is ſtop'd. For part of the Bl ſo arreſted, and for want of due Mot corrupted, being at length carried off

the Veins, and remix'd with the whole Maſs thereof, muſt of neceſſity more or leſs pollute it.

But if we convert the Eyes of our Curioſity upon the *Effects* of this Febrile Ferment, and conſider the manner and proceſs of its acting upon the Blood; we ſhall ſoon find, that what hath been ſaid of the *Narcotick* and *Fixative* Power of it, will be ſufficiently conſentaneous and evident to engage our Belief. For, from thence it will appear, by what reaſon and way the Ferment is wont to exert its Forces, and exerciſe its Tyranny upon the vital Spirits, in the divers times of a *Paroxyſm* or fit of a Fever, *viz.* in the beginning or *invaſion*, in the *augment* or increaſe, in the Vigour or *Achme*, and in the *Declination*.

I ſay then, that before the actual Invaſion of a Paroxyſm, the Febrile Ferment is already diffuſed through the Blood, and united with the vital Spirits. Upon this, it of neceſſity comes to paſs, that the Spirits being clogg'd, and as it were inviſcated by the pendulous Clammineſs thereof, remit ſomewhat of their Vigour and Endeavour to Expanſion: And conſequently with leſs briskneſs irritate the Ears and Ventricles of the Heart, and Arteries conjoyn'd to them, to contract themſelves, in order to the Diſtribution of the Blood. Hence it comes, that the free Tranſpiration of the *halitus* or ſteams of the Blood is more or leſs Check'd, and render'd more ſlow and weak than it ought to be. And this makes the *firſt* inſult or ſurpriſe of the *cold* Fit, which tho' ſcarcely perceptible in the beginning, comes creeping on more and more, till the Eclipſe it brings upon the vital Spirits, be manifeſt from the weakneſs and languid Motion of the Pulſe, and from the chilneſs of the whole Body, and dead paleneſs of the Face, *&c.*

A little after, the Pulſe is more retracted and languid, and the Eclipſe increaſing, the Nails of the Fingers become pale and of a leaden Blew, the extream Parts grow ſenſibly Cold, and all the other Symptoms grow more Strong and Vexatious, ſo that the Patient is now compell'd to feel the Attack his Enemy is making upon the Guards of his Life. And this is the *ſecond* ſtep of the cold Fit.

Which ceaſes not yet, but is continued a good while after its firſt ſenſible Invaſion; the depreſſion of the vital Spirits, the retraction of the Pulſe, and the conſequent Diminution of Heat, ſtill by degrees increaſing. Nevertheleſs, ſoon after the beginning, the irritation of the vital Spirits to riſe up and oppoſe their inteſtine Enemy, and to repel it by their ſpontaneous Expanſion, begins. For, firſt they ſtrive to reſiſt Oppreſſion by the Clammineſs of the Febrile Fermentation, and to ſhake off the Clogg, by their Natural Agility. Then the Maſs of Blood, being ſlowly and heavily diffuſed into the Parts of the Body, doth in ſome degree ſtagnate in the Avenues of the Heart, and by its reſiſtance burden the Heart and Arteries, and ſo incite them to make more frequent Pulſes, to diſcharge it. Then the *Effluvia* of the Blood, being by intercepted Tranſpiration retained, and by the Veins returned to the Heart, ſerve ſomewhat to excite the Spirits, and to diſcuſs a little of the Clammy Ferment repreſſing them. But yet theſe three irritations conjoyned, are not from the beginning of ſo great Moment, as quickly to hinder the increaſe of the Cold, or farther Depreſſion of the vital Motion: Only they ſo far avail, as to hinder the influent Life from being wholly Eclipſed. And at this time it is, that the firſt certain Signs of actual Fermentation of the Blood, ſhew themſelves Phyſicians accurately obſerving them. For, ſo ſoon as the certain Signs of an univerſal Oppreſſion of the vital Spirits appear; we may from that time date the Commencement of the Fermentation immediately conſequent thereunto: Becauſe they declare that the Ferment hath already actually begun its Work.

Theſe *Signs* and *Symptoms* then are (as I have ſaid) *firſt*, *Retraction of the* Pulſe, *Chilneſs*, *Paleneſs*, and ſometimes *Blewneſs* of the extream Parts, chiefly of the Nails, tip of the Noſe and Lips, and ſome light *Conſtriction* of the whole Skin. Becauſe at that time there happens ſome Oppreſſion of the vital Heat, which governs the Pulſe, renders all Parts actually Hot, gives a vivid and grateful Tincture of Red to all, and plumps up the Skin that otherwiſe would ſhrink it ſelf up.

Secondly, A troubleſome Senſe of *Cold*, accompanyed with a *Horrour*, *Trembling*, *Shivering*, or *Shaking*. All from the difficult

Paſſage of the Blood through the Habit of the Parts. For the Blood being but weakly emitted from the Heart, and paſſing ſlowly through the Subſtance of the muſcular Parts, hurts and offends them by Vellication or Attrition.

Thirdly, A weak and quivering *Voice*, and ſhortneſs of *Breath*, for the moſt part trembling and unequal: Which ſeems to ariſe, partly from a depreſſion of the vital Heat, partly from Cold unequally affecting the Lungs, and hindering the free ingreſs and egreſs of the Air; and partly from the difficult Paſſage of the Blood, either through the Lungs themſelves, or through the Muſcles, helping to move them.

Fourthly, The *Moiſture* of the Mouth and in the Glands circumjacent begins to be dried up, and thereupon enſue *Thirſt* and *Dryneſs* of the Tongue; the Reaſon of which ſeems to be this, that the *Latex ſeroſus* is in the febrile Fermentation ſo conſounded with other Humours, that it cannot be ſeparated from them in the Glandules deſtined to the Secretion of it. Other Effects or Signs of the Fermentation obſervable in this Beginning of the Paroxyſm, I reſerve till we come to the *Augment*, in which they become more conſpicuous.

In the *Augment* therefore no new Motion ariſes, only the former are either by degrees leſſen'd or increas'd. Thoſe that belong to the ſimple *Depreſſion* of the vital Spirits are gradually diminiſh'd; but thoſe that are referrible to the *Incitation* or *Suſcitation* of them are by little and little augmented. Of the *former* Sort are, *Chilneſs*, Senſe of *Cold*, *Shivering*, *Trembling*, *Quaking*, all which by degrees ceaſe and vaniſh; becauſe upon the raiſing of the Pulſe, the Blood is tranſmitted more briskly and ſpeedily through the Habit of the Parts. The *Voice* alſo becomes more ſtrong and uninterrupted, and the *Reſpiration* more frequent and equal, for the ſame Reaſon. On the *contrary*, the provoked vital Spirits now riſing up againſt their inteſtine Enemy, cauſe a manifeſt Increaſe of the febrile Fermentation and Tumult; for the expanſive Luctation grows more and more fierce and exorbitant, and recedes farther from the natural State, till it becomes turbulent, hoſtile, frothy and unequal. The *Conſequents* of theſe irregular Motions are, 1. *Inquietude*, *Jactigation*, and ſometimes P[ain] of the outward Parts, but chiefly of t[he] *Head*; all from the difficult Tranſmiſſ[ion] of the Blood through them. 2. *Frequ[ency]* of the Pulſe, and now and then *robuſt* V[i]bration of the Heart and Arteries; probab[ly] from the intercepted Courſe of the Blo[od] and the Augmentation of Heat. 3. *Dim[i]nution of Tranſpiration*, which, though no[t] ſomewhat greater than from the Beginni[ng] continues much leſs than it ought to b[e] conſidering the Abundance of *Effluvia* Exhalations of the Blood raiſed by the i[n]tenſe Heat. 4. Greater *Conſumption* of t[he] *Latex* in all Parts of the Mouth, and con[ſe]quently more grievous *Thirſt*. 5. *Nauſeo[ſi]neſs*, and ſometimes *Vomiting* or *Flux* of t[he] Belly; for the Stomach and Guts are of a[ll] Parts moſt troubled and offended by the t[u]multuous Afflux of the Blood, as well b[e]cauſe of their nervous Texture, and th[e] exquiſite Senſe thence ariſing, as by reaſ[on] of the Matters contain'd in their Cavi[ties] which (the containing Parts being irritate[d] fluctuate, and ſo become more apt to b[e] moved and ejected upward or downward[s]. And for the ſame Cauſes the ſame Parts a[re] often moleſted with *Winds* and *Eructation[s]*. all *pneumatick* Fermentations (in the Nu[m]ber of which our febrile Fermentation ha[s] a Place) conducing much to the Generati[on] of Winds. During this Time of the P[a]roxyſm, the Fermentation and Heat, and a[ll] the Conſequents of them here recounte[d] excepting perhaps the laſt, are augmented b[y] degrees, till they arrive at the *Achme* or *Sta[te]*. But ſo ſoon as the Tranſpiration comes to b[e] more free, and anſwerable to the Abundan[ce] of Exhalations ſteaming from the Blood, [or] as they no longer recoil by the Veins to i[n]creaſe the Eſtuation of the Blood, the *Au[g]ment* ends, and the *State* of the Fit ſu[c]ceeds.

In which the Fermentation and Ard[our] perſiſt a while in their Violence and Fur[y]. And though at this Time ſome Parts of t[he] oppreſſing Ferment begin to be diſcuſs'd a[nd] expell'd by laborious Sweat, yet the vi[tal] Spirits are by that tumultuous Motion [ſo] profuſely ſpent and exhauſted, that Natu[re] ſuffers almoſt as much of Loſs by that E[va]cuation, as ſhe receives Relief from t[he] Victory and Expulſion. Whence perhaps com

omes, that yet the Conflict appears doubtful and equal, till the Beginning of the *Declination*, when the febrile Heat and all its Concomitants are by degrees mitigated.

And then it is, that the Victory of the vital Spirits being compleat, the remaining parts of the febrile Ferment are, by an universal Sweat flowing without any considerable Detriment of the Strength of the Patient, dispers'd and exterminated: For this sweat is a kind of Despumation of the Impurities of the Blood that caus'd the Paroxysm; whereupon soon ensue a Remission of the burning Heat, a Cessation of Anxiety and Pains, and a fresh Diffusion of the *Lac serosus* into the Throat and Mouth for the quenching of Thirst; and in fine, a Cessation of all other vexatious Symptoms of the late Conflict; and so at length the Paroxysm is ended. Now from this our continuous Solution of all the *Phænomena* of the fit of a Fever, ye may easily judge of the Reasonableness of the precedent *Hypothesis*, according to which I have endeavoured to explicate them, and how far the same may deserve your Approbation or Dislike.

Nevertheless I am willing ye should suspend your Sentence, till I have carried on the *Hypothesis* farther; for there yet remain many other Appearances to be solv'd. I proceed therefore to the primary *Differences* of Fevers, in hope that they also may be commodiously deduced from the same Principles.

Forasmuch as it is probable from what hath been said of the Nature of a Fever in general, that all Fevers arise from and essentially consist in a Fermentation of the Blood; we may with Reason infer, that the Diversity of Fevers, how great soever it be, proceeds from nothing else but the divers Fermentations of the same Blood: For the Diversity of Effects is for the most part respondent to the Diversity of Efficients. And since it is scarce possible, but that from various Ferments, various Kinds of Fermentations should arise; it necessarily follows, that the various Sorts of Fevers are to be deduced from equally various Ferments actually hindering the vital Mication of the Blood. And I hold, that there are so many Differences of febrile Ferments, as there are divers Natures or Dispositions of Crudities incident to the Blood, and apt to inquinate it. To know all these distinctly, and to explicate each of them by a particular Description, is perhaps impossible; so great is the Variety of crude Humours that may be admitted into the Blood, and so manifold the Combinations of them that may happen to pollute it. Let it suffice then, if reflecting upon the chief Sorts of *Crudities* already described, we shall from thence congruously derive the *primary*, *i. e.* the most frequently observed *Differences* of Fevers.

By *Crudity*, I here understand any Inquinament or Depravation of the Blood whatsoever, proceeding from the Defect of due Preparation thereof, for the Generation of vital Spirits; as I before declared. Now the Matter in this Sense *crude*, may be distinguish'd into *ordinary* or familiar to humane Nature, such as arises from the erroneous Use of the six Non-naturals; and *extraordinary* or alien and hostile to humane Nature. From the *former* come all Fevers call'd *simply putrid*; from the *latter*, *malignant* and *contagious* or venenous.

The *ordinary* may be subdivided into, 1. *Recent* or lately generated, such as is either carried out of the Stomach and Guts in the Form of crude Chyle, or reduced from some Part or other inflamed or otherwise corrupted; and, 2. *Inveterate*, or in a long Tract of Time by little and little congested, and adhering to the Substance of the solid Parts. The *former*, if it happens to pass into a febrile Ferment, produces a Fever putrid indeed, but of only *one* Paroxysm. The *latter* likewise generates a Fever putrid, either accompanying some other Malady, or symptomatick; but each of them, either *continual* of uncertain Exacerbation, or *intermittent* of uncertain Paroxysms.

The *extraordinary* or malignant, which includes some certain seminal Principle dangerous and hostile to humane Nature, is also *double*, *viz.* either it is disseminated by Contagion, or is primarily bred in the Body affected. The *former*, though resolved into an Exhalation and dispers'd through the Air, still retains its poisonous Vertue, as the *Miasma pestilentiale* or Infection of the Plague. The *other* is either not resolved into Exhalations, as *Arsenick*; or is, in the very

Reſolution, deſpoil'd of its ſeminal Malignity, as the Breath of a *mad Dog*, which ſeldom or never infects alone, without the *Saliva* in Froth.

Having exhibited to your Conſideration this plain and brief Scheme of the different material Cauſes, from which I ſuppoſe the principal Differences of Fevers to proceed, I muſt reflect upon the Heads thereof more particularly, and in the firſt Place reſume the Explication of Crudity not malignant, as that which both more frequently occurs to our Obſervation, and is leſs obſcure.

The *Matter* of *putrid* Fevers *not malignant* proceeds (as I lately inſinuated) either, 1. From Defect of Concoction of the Chyle in the Stomach and Inteſtines; or, 2. From Defect of due Eventilation and free Motion of the Blood in its Circuit.

Defect of Concoction of the Chyle is a Thing ſo common, and ſo fully explain'd by Phyſicians in their practical Writings, that it is ſufficient for me to name it. And indeed in all Fevers, the concoctive Faculty of the Stomach is wont ſo much to languiſh, that ſcarce any Thing of Aliment can be, without Detriment, taken into the Stomach, already troubled and inquinated with vicious and corrupt Humours; for then the Food is not digeſted, but whatever of either Juice or Tincture is drawn from it remains crude, and turns to the Augment of the Matter of the Fever: Whence it comes, that Faſting and a thin Diet are ſo much commended by all in putrid Fevers. Only in peſtilential, a Diet leſs ſpare is ſometimes allow'd with good Succeſs; becauſe the Benignity and ſweet Spirits of the Aliment are found to contemperate the *Seminium peſtiferum*, and reduce it to a milder Diſpoſition. Not of *theſe* Fevers therefore, but only of *thoſe*, are we to underſtand the Counſel given by *Hippocrates*, *Aphoriſm. n. lib. 2. Corpora impura, quo plus Alimenti aſſumunt, eo pluribus Damnis augentur; & (Aphoriſm. 7. lib. 1.) Si Morbus ſit peracutus, tenuiſſima Diæta eſt utendum.*

Defect of due Tranſpiration or Eventilation, and of free Circuition of the Blood, is ſometimes the Cauſe, ſometimes the Effect of Fermentation therein. The *Cauſe*, if no other Vice, before diſpoſing the Blood to Putrefaction, hath given fit Matter for the Generation of a Fever; for Want of free Tranſpiration, and Interception of the Courſe of the Blood in any Part of the Body, are alone ſufficient to inſer Putrefaction upon the Blood; but then the Fever is for the moſt part eaſily diſcuſs'd, and with one univerſal Sweat wholly ſolv'd. It ariſeth commonly from the diminiſh'd Perſpirability and Permeability either of the whole Body, or of ſome private Part, whoſe inconſpicuous Pores are conſtipated or obſtructed; and this happens either with or without Extravaſation of Blood. With Extravaſation, comes a *Tumour*, if not an *Apoſtem*, which moſt commonly produces a Fever of uncertain Exacerbation; as is frequently obſerv'd in great Obſtructions and Abſceſſes of the Lungs.

Having conciſely recounted the procatartick or antecedent Cauſes of crude Matter apt to induce putrid Fevers, I muſt come to explain what I ſaid of the *Aptitude* of crude Chyle received into the Blood to corrupt into *Miaſmate febrili*. That I may do this with Perſpicuity and Coherence, two Things occur here to be conſider'd: *One* is, *when* that ſuppos'd Aptitude or Diſpoſition of Chyle imperfectly concocted comes to be matured or exalted to an actual Fermentation of the Blood: The *other*, *where* that crude Chyle is wont to lurk or lie conceal'd, until attaining to Ripeneſs, it hath acquired Force ſufficient to induce Fermentation upon the Blood.

To the *former* of theſe two Queſtions therefore I anſwer, that crude Chyle, though from its firſt Admiſſion into the Blood it continually tends toward a febrile Ferment, doth yet notwithſtanding rarely attain to that laſt Degree of Depravity, where it meets not with an *Apparatus* of like Matter before congeſted in the Body, ſufficient to augment its Forces, and ſerve for convenient Fuel to a Fever: For it is by long Experience found, that very few fall into a ſimply putrid Fever, unleſs after many Errors admitted in the Uſe of the ſix Non-naturals: Nor is the febrile Ferment it ſelf wont, ſo ſoon as it is exiſtent in the Body, to kindle a Fever by breaking out into Acts of open Hoſtility upon the ſudden, but ſecretly creeping on as it were, and paſſing through certain Degrees of Operation ſucceſſively. Firſt, it is inſenſibly diffuſed through and intimately commix'd with the

who

hole Mass of the Blood, after the manner other Ferments. Then inwrapping the tal Spirits by little and little with its lammineſs, it diminiſhes their Agility, d diſpoſes them to Sloth. After this, it deavours to inviſcate, bind, and as it ere ſuffocate them; and then it is, that om their expanſive Reluctation, the Con- ct and Fermentation Commences. All hich may be collected from intermittent vers, at leaſt, if it be true (what many emi- nt Phyſicians hold) that the whole Febrile atter that cauſes a Paroxyſm, is as it were rn'd out and conſumed in that Paroxyſm: sin an intermittent Tertain, there intervenes whole day of Vacancy from a Fever, and quiet betwixt every two Paroxyſms; du- ng which Interval, the Febrile Ferment is ly diſpoſitive, and preparing to unite it lf intimately with the vital Spirits. But a ſimple Quartan, two whole days inter- ne betwixt the precedent Paroxyſm, and e crude Matter doth not preſently pro- uce a Fermentation, but by degrees, and way of Diſpoſition. Which may be ſuf- cient to ſolve the *firſt Queſtion*, viz. *When* e Crudities commix'd with the Blood me to acquire the degree of Exaltation re- iſite to induce an actual Fermenttaion pon the Blood.

As for the *other, viz. Where* the ſame ude Matter is wont to be congeſted, and lye in ambuſh till that time; if the whole atter of the precedent Paroxyſm, be ſpent d conſumed in the Paroxyſm, as hath en ſuppoſed: Then it neceſſarily follows, at the Matter of the ſubſequent Paroxyſm, uſt either be generated anew, in the time tervenient betwixt the two Fits, or lie con- al'd ſomewhere in the Body, either in the eſſels carrying the Blood, or out of them; om whence, as from its *Fomes*, it may af- r certain Intervals of Time, ſally forth infect the Blood, and invade the vital pirits. For both theſe, cannot be true; d therefore it remains to be inquired, hich of the two is moſt likely to be ſo. y Opinion is, that the Matter of every bſequent Paroxyſm is not *generated anew*; d my *Reaſons* are theſe.

(1.) So ſoon as any Paroxyſm is ended, e very Eſſence of the Fever Ceaſes for that me, and the Blood quickly returns to an *Apyrexia*. Now if the Cauſe be extirpated together with the Diſeaſe, nothing will be left remaining in the Body to continue it: And by conſequence, every new Paroxyſm will be a new Fever; which no experienced Phyſician, who hath obſerved the Diſeaſe to be of the ſame Genius or Nature from the firſt Fit to the laſt, will eaſily be brought to grant. (2.) The ſame may be confirmed by this, that intermittent Fevers, even in poor Country People, frequently run thro' all their times regularly, by degrees aſcending to their State, and thenceforth gradually tending to their Declination, when no Phyſician is called to ſuccour Nature: So that merely from diligent Obſervation of the Motion of the Fever, a certain Prognoſtication of the State and final Ceſſation of it, may be collected, which would be impoſſible, if the Matter of the Diſeaſe were every day generated *de novo*: For who could foreſee, when that new Generation would ceaſe?

(3.) The Cauſe of the Fever coming *ab extra*, is accidental, and depends on a leſs or greater Error committed in Diet, and is conſtituted *extra Febris eſſentiam*; nor can any *indication* be from thence defumed. And our Dr. *Gliſſon* affirms, that he knew a Man, who being of a ſtrong Conſtitution, and afflicted with a *Tertian Intermittent*, obſtinately abſtained from all Meat and Drink, from one Fit to another; and yet could not thereby elude the return of his Fever. It may be therefore with good reaſon inferred, that putrid Fevers have an internal *Focus* ſomewhere in the Body, whence the material Cauſe of them breaking forth, and gathering freſh Forces, invades and irritates the vital Spirits again and again, even till the *Fomes* be uttterly Exhauſted and Conſumed.

There are (I confeſs) many great Wits, who in every intermittent Fever, ſeek for a *peculiar Fomes* or Seat of the Cauſe. I confeſs alſo, that ſometimes ſuch a particular and partial *Fomes* may be found: As for Inſtance, in the Stomach, or in the *Pancreas*, or in the Meſentery, and other Parts of the *Abdomen*. And an Inflammation of the Lungs is in ſome ſort the *Fomes* of a *Peripneumonia*; an Inflammation of the *Pleura*, the *Fomes* of a Pleuriſy; and *ſic de multis aliis Partibus*: So that it cannot be denied, but

but both intermittent and continual Fevers may ariſe from particular Seats, and that an Apoſtem, chiefly an *Empyema*, may miniſter Fuel to a Fever; yea more, that an Inflammation repercuſs'd from the outward Parts, and a Gangrene in any the remoteſt Member of the Body, may produce a continual Fever, by ſending forth corrupt Matter to pollute and infect the Blood. All this (I ſay) muſt be confeſſed. And yet nevertheleſs it muſt be acknowledged, that beſides theſe particular *Fomites* of Fevers, there is a certain *General one*, common to all putrid Fevers: And this general *Fomes* I hold to be the very *Parenchyma* of the Parts nouriſhed out of impure Juices.

For this *Fomes* is of all others hitherto ſuppoſed, moſt conſiſtent with the Circuition of the Blood, by which it is commodiouſly carried to all Parts; and diffuſed univerſally: Whereas other impurities can ſcarcely be ſo accumulated in the ſolid Parts, but they muſt, when extravaſated, obſtruct the free courſe of the Blood. If they be ſuppoſed to ſtick, and be congeſted in the capillary Veſſels, or in the inconſpicuous Pores of the Parts; they muſt be a manifeſt and intollerable Obſtacle to the Pertranſition of the Blood. If out of the Veſſels, they ſtagnate in the Habit of the Parts, they muſt induce, not a Fever, but a *Cachexia*, or an *Anaſarcha*. Compelled therefore we are to fly to the very *Parenchyma* of the Parts; which in every putrid Fever are neceſſarily fuſed or melted by degrees, and being, as neceſſarily become Fewel to continue the Fever. For, in *continual* Fevers, the ſubſtance of the Parts amaſs'd out of Crude and impure Chyle, is *continually* melted, and ſo maintains the Fermentation without Intermiſſion, until all the Fewel be conſumed, and then the Fever is extinguiſhed. But in *intermittent*, the ſame impurities are melted by turns, or *Intervals*; and in every Paroxyſm, ſome Portion of 'em is colliquated into a kind of *Sanies*, or putrid Matter; which being remix'd with the Blood, becomes, in a *Tertian*, the Fewel of a Paroxyſm to recur on the *Third* Day from its Fuſion; in a *Quartan*, of a Paroxyſm to invade on the *Fourth*; in a *Quotidian*, of a Fit to return on the *next* Day; *& ſic de cæteris.*

And as to the *Duplication* and *Triplication* of theſe intermittent Fevers: 'Tis probable that when of a *Simple Tertian*, is made a *double* one, the Simple is not the direct Cauſe of the double: But the latter ariſes from Cauſes like to thoſe, from which the former took its beginning: So that a double Tertain may be rightly enough accounted to be *two ſingle Tertians* alternately ſucceeding and complicated with each other. And the ſame, *mutatis mutandis*, may be ſaid, with equal Congruity, alſo of the origin of a double and treble *Quartan.*

But there remains yet another *Difficulty* greater than either of the two precedent, *viz.* concerning the *Suſpenſion* of the Action of the crude Matter, to the time of the Paroxyſm, in which it is actuated. That the State of which *Queſtion* may be the better underſtood, let us (for inſtance Sake) ſuppoſe, that in a double Tertian, *A. B. C. D.* are four diſtinct crude Matters, melted and ſet afloat in the Mais of Blood in four ſucceſſive Paroxyſms. Let us ſuppoſe alſo, that this Fever firſt invaded the Patient upon *Monday*, and that in the firſt Fit, it melted ſo much of the crude *Parenchyma* of the ſolid Parts, as may ſuffice to produce a new Fit on *Wedneſday* following. Let us ſuppoſe farther, that on *Tueſday* another Tertian began, and during that firſt Fit in like manner melted ſo much of the crude *Parenchyma*, as may be ſufficient to raiſe a ſecond Fit on *Thurſday* following. Theſe things being ſuppoſed, the Queſtion is, why the crude Matter *B.* melted on *Tueſday*, is not diſſipated or corrected on the *Wedneſday* following, when the crude Matter *A.* cauſing a Fit, is by the Fermentation rarefied, and expelled by Sweat: Why, I ſay, the Matter *B.* being remix'd with the Blood all *Wedneſday*, when the Matter *A.* was Fermented, is not by that Fermentation corrected and diſſipated at the ſame time; but ſuffered to lye dormant, and cauſe a Fit on *Thurſday* following.

To untie this Knot therefore, I ſay, that the Febrile Fermentation doth not much alter any crude Matter, that doth not yet *actually* impede the vital Motion of the Blood. For, the Fermentation is regulated by the vital Spirits, which in the caſe propoſed, chiefly oppoſe and diſſipate the

Matter *A.* which alone by its Clammineſs actually hinders their expanſive Motion. Hence it is, that in the Fermentation happening on *Wedneſday*, the vital Spirits are not much offended with the new Matter *B.* then melted and floating in the Blood, becauſe it is not actually Febrile, nor doth it oppreſs them, ſo as to incite them to vindicate their Liberty by their expanſive Motion. And thus the difficulty ſeems to be ſolved.

What hath been ſaid a little before, of the general *Fomes* of the putrid Fevers, as well Continual, as intermittent, *viz.* that it is in the very *Parenchyma* or Subſtance of the ſolid Parts, amaſſed out of crude or impure Chyle; may perhaps to ſome of my Auditors, long accuſtomed to the vulgar Doctrine of Phyſicians, concerning the Genealogy of Fevers, ſeem to be only Precarious, and as eaſily denied, as affirmed: Becauſe it ſtill remains doubtful, *how Chyle crude or impure can be, inſtead of good and laudable* Succus Nutritius, *or Aliment, converted into the Subſtance of the ſolid Parts.* To obviate this their doubting therefore before it ſettle into a prejudice more difficult to be removed, it concerns me to aſſert, that there is many times an *imperfect* Nutrition, or Vegetation and Augmentation, as well as a *perfect*, obſerv'd in the Bodies of Men; and conſequently, that the *Succus Nutritius*, or proximе Aliment of all Parts, is either *pure*, i. e. perfectly Concocted; or *impure*, i. e. imperfectly Concocted. Whence it comes, that the Bodies of ſome Men are even vulgarly ſaid to be more or leſs *pure* than thoſe of others.

Thoſe few, who are ſo happy as to have Bodies in all Parts *pure* and clean from crude and vitious Humours, do not only from the right uſe of the ſix Non-naturals, enjoy perfect Health; but have this farther Advantage, that their ſolid Parts not being augmented by the accretion of crude Matter, they carry in them neither any *Febrile Fomes* congeſted in the Habit of their ſolid Parts, nor the leaſt Diſpoſition to any other Diſeaſe. When on the contrary, *impure* Bodies, either through intemperance, or too ill Diet, Surfeits, Compotations, and other Debauches and Diſorders; or from want of Exerciſe, to correct and diſſipate the Crudities they have congeſted; are cram'd and plump'd up with impure Nouriſhment, and perhaps alſo augmented to an unprofitable and unwieldly Bulk. Theſe then muſt of neceſſity abound with a great ſtock of crude Matter, accumulated chiefly in the Subſtance of their ſolid Parts. Which when a Fever comes, from what cauſe ſoever, are melted by Degrees, and daily afford new Matter, to ſerve as prepared Fewel to the long and dangerous Fever, whether continual, or intermittent. But Bodies clean and pure, though perhaps liable to be ſurpriſed with a light feveriſh Diſtemper; are in much leſs Danger from thence: Becauſe their ſolid Parts have not been imperfectly recruited with impure Nouriſhment; and conſequently the *Liquamen* of them is not ſo *Crude*, as to ſuffice to renew often, or long continue the *Fermentation.* From the Teſtimony of our very Senſes it is evident, that in all putrid Fevers, the Parts of the Body are more or leſs extenuated and colliquated: And that the crude *Liquamina* of them are the material Cauſes of new Exacerbations in continual Fevers, and of new Paroxyſms in intermittent, is highly conſentaneous to reaſon. Hence it is, that Men recovering from long Fevers, if they manage their Health circumſpectly and with Temperance, attain to a Renovation as it were of their Youth: Becauſe all the Subſtance of their Parts, that was amaſs'd out of Crude and impure Matter, being by the Fever conſumed, their Bodies are now repaired with pure and convenient Juices, ſuch as abound with ſweet Spirits duly exalted and excited by Concoction in the Stomach. Hence alſo we are led to a clear underſtanding of the true Reaſon of that *Aphoriſm* commended to our Obſervation by *Hippocrates: Si febricitanti, nec omnino leviter, ſuo in ſtatu maneat corpus, nihilq; concedat morbo; aut hoc etiam plus æquo gracileſcat, calamitoſum: Hoc enim ægri infirmitatem ſignificat, illud vero diuturnitatem morbi.* For, the prognoſtick holds certain, *ratione tum cauſæ, tum ſigni.* If the Habit of the Body be not extenuated in proportion to the Violence or Duration of the Fever, the cauſe muſt lye either in the abundance, or in the Contumacy, that is the great Viſcidity or Clammineſs of the crude Matter congeſted and affix'd to the *Parenchyma* of the Parts: And

there-

therefore an obſerving Phyſician may from thence ſafely Predict, that the Fever will prove of long continuance at beſt, if not fatal in the End. On the other ſide, if the extenuation be too great, it muſt come from the great Force of the Heat or Fermentation in the Blood, that diſſipates all things, not only the crude Matter pre-exiſtent in the Habit of the Parts, but even the vital Spirits themſelves, and the inſite Spirits, that being intimately united with the Vital, ſhould reinvigorate the Parts with Life, and conſerve them. And therefore ſuch impetuous Extenuation, is likewiſe both cauſe and ſign of extream Calamity. *Exhauſtis enim ſupra modum & ſpiritibus, & partibus Solidis, omnis ratio pepaſmi deſideratur.*

All theſe Reaſons duly conſider'd, it muſt be granted that Bodies cannot poſſibly continue in all points pure and clean, if they be nouriſh'd with impure or crude Juices. Sound, indeed, and Healthy, they may be ſaid to be at preſent, becauſe they ſeem to foſter no proxime Cauſe of Sickneſs diſcernable by a Phyſician: And yet nevertheleſs, ſince they carry about Crudities ſecretly congeſted in the very Subſtance of the ſolid Parts, which by occaſion of any light feveriſh Diſtemper, that would not otherwiſe laſt above a Day or Two, may be melted and remix'd with the Blood, and long protract that Diſtemper: We are obliged to acknowledge, that ſuch Bodies are really foul or impure, and contain in them a *Diſpoſition* to a Fever more or leſs Remote. Otherwiſe it will follow that all Bodies actually Sound, are in reſpect of the Habit of their Parts, either equally diſpoſed, or equally indiſpoſed to Fevers, and to the continuation of them: Than which nothing certainly can be more Falſe. For, have we not obſerved frequently, that Fevers, as well continual as intermittent, have in the beginning appear'd Mild and Gentle, ſo long as they were fomented only by Matter contained in the Veins and Arteries: and yet afterward, when they began to be ſupplied with new Matter of Fewel from the colliquated Crudities that had been long congeſted in the Habit of the Body, they have raged in Extremity, and continued long before Nature, however accurately aſſiſted and ſuccour'd by our Art, could bring them a *Criſis*? Conclude we therefore, that in p trid Fevers, there is no other *Fom*:s, b the deſcribed Crudities, by long Intem rance and other Errors in Diet, conge in the Habit of the ſolid Parts. For, th are in all putrid Fevers daily reſolved fuſed into a certain *Sanies* or corrupt M ter, and conſtitute a new *Febrile Ferme* Which is the thing we have gone ſo far bout to find.

But yet I muſt not omit to ſubjoyn, th theſe *Liquamina* of the ſolid Parts imp fectly nouriſh'd, are not confined wit the narrow compaſs of *one* ſingle Ge but diffuſed through a large Field of in finite *variety*. For, as indulgent Nat hath granted to us various kinds of *Alime* each of which is in its peculiar Qualities Proprieties in ſome ſort diſtinct from all reſt; and as the *Juices* or *Tinctures* extra from them by the concoctive Faculty of Stomach, are in diverſity reſpondent to diverſity of our Meats and Drinks: So m it be granted, that the *Crudities* after im fect Digeſtion admitted, firſt into the Bl and then into the Habit of the Body, there affix'd to the ſolid Parts, and at le reſolved into a certain kind of *Sanies*, is moſt apt to afford Fewel to putrid Fe (as hath been often affirm'd) cannot b of a Sort, but ſome different from ot reſpectively to the different Matters of w they were generated. And of theſe do leſs the variety is greater than can poſ be known by any Phyſician however ous; ſo far are we from hope to reduce all to Computation. It were hard the me, if any here preſent ſhould exact me an accompt of more of theſe ob Differences, than what my preſent in requires me briefly to explain: And al learned Hearers will (I preſume) be tented, if I do my devoir to reduce in general to the *Analogous Humours* o Antients above deſcribed, namely, *Phlegm*, and *Melancholy*; not pure or ral, but *Corrupt*. For, from *theſe Hu* taken in the Senſe afore explicated, m commodiouſly and congruouſly ded both the principal *Differences* of putri vers, and the moſt probable *Cauſes* of Differences.

First therefore, I must put you in remembrance of what I have more than once asserted, *viz.* That the Humours by this Hypothesis assigned to putrid Fevers for their Causes both Antecedent and Conjunct, are such which are not *exolete* or stale and despoiled of their Spirits, and grown vapid; but sufficiently *stored with Spirits*, noxious and infest to the vital Mication of the Blood.

Then I with good reason suppose that when the *Crudities* received first into the Mass of Blood, and after into the substance of the Parts, come near to the Nature of the *Serum* of the Blood, now corrupt, and by that putrefaction render'd acrimonious and well nigh Corrosive (which emulating the bile contained in the Bladder of Gall, makes the *Choler* of the Antients) there is congested and prepared Matter most apt and disposed to produce *Bilious* Fevers, as they are call'd *Tertians*, either continual or intermittent.

That in case the congested Crudities nearly resemble the white and viscid *Grumus* of the Blood (which makes the Analogous *Phlegm* of the Antients) but corrupt: Then there is laid up Fewel most convenient to foment *Pituitous* Fevers, *Quotidians* continual or intermittent.

That if it happens, that the Crudities congested be of such a Nature and Condition, as to be affine to the Analogous *Melancholy* of the Antients, *i. e.* to the *blackish Grumus* of the Blood, degenerate from its natural purity, and corrupt: Then the Bodies carrying them about are obnoxius and prone to a *Quartan* e'er long to invade them. And this may suffice to explain the Sentiments suggested to me by *Dr. Glisson*'s New Doctrine, concerning the most general and obvious Differences of Crudities apt to produce Fevers, so far forth as they may be taken for the *Conjunct* Causes of putrid Fevers.

I come then to the Fundament of the so often mentioned division of putrid Fevers into *Continual* and *Intermittent*; that we may opportunely investigate, what that is, on which this remarkable difference seems immediately to depend. This in probability is nothing else but the very *Fermentation* of the Blood, in which alone the formal Reason of all Fevers doth consist; and which by vehemently exagitating the whole Mass of the Blood, sometimes *continually*, sometimes by *Intervals*, and those one while *certain* and *ordinate*, another while *uncertain* and *inordinate*; induces that intense and afflicting *Heat*, in which alone the Antients have unanimously placed the Essence of a Fever; and renders the Pulses of the Heart and Arteries *more frequent* than they ought to be; so that from thence alone, as from a Pathognomonic Sign, a Physician may certainly conclude of the presence of a *Fever*.

A continual Fever therefore is that which from the first Moment of its Invasion, to the last of its duration, continues and afflicts without Intermission, never coming in all that time to a perfect *Apyrexia* or utter Extinction. This Fever, if it be mild, gentle, unaccompanied with grievous Accidents or Symptoms, and but of one days continuance; is thence call'd an *Ephemera* or *Diaria*: If in like manner mild, but of two, three, or four Days Duration, it is denominated accordingly a *Diaria* of a few Days, or more properly, *Synochus Simplex*.

An *Intermittent* Fever is that, in which the Febrile Fermentation doth not dure from the beginning to the end continually, but is *intermitted*, and returns with diverse Paroxysms after Intervals, now *shorter*, now, *longer*: And these Paroxysms running thro' their peculiar Times; namely their beginning, Augment, State, and Declination, there Alternately, *i. e.* after the end of every single Paroxysm, succeeds an *Apyrexia*, not perfect perhaps, but *quoad Sensum*. From this vicissitude, or rather from the various Intercalation of the Paroxysms, various sorts of intermittent Fevers have, for distinction sake, obtain'd various *Names*. In particular, when a new Fit, in proportion respondent to the former, returns daily, *i. e.* once in every twenty four Hours, the Fever is named an intermitting *Quotidian*. When a Paroxysm recurs every other Day, or on every third Day, 'tis called a *Tertian*, and by the Vulgar, a *third days Ague*. When the Paroxysm recurs not till after two whole Days of intermission, 'tis call'd a *Quartan*, or *fourth days Ague*: And forward; for there have been observ'd also *Quintans* and *Sextans*, though very rarely. Here give me

leave *en paſſant* to note, that the word *Ague*, by which the common People underſtand an intermittent Fever, is derived from the *French* Adjective, *Aigu*, which ſignifies *Acute* or *Sharp*: Perhaps becauſe an intermittent Fever is *Acute* during the Paroxyſm at leaſt, and afflicts the Patient with *ſharp* Pains; though by Phyſicians, reſpecting rather the Duration, than the vehemency of this Diſeaſe, it is number'd, not among Acute, but among *Chronick* Fevers. How properly therefore the *Engliſh* call an intermittent Fever, an *Ague*, I leave you to judge, while I return into my way.

There is yet another *Species* of Fevers referrible neither to continual, nor to intermittent, but *compounded* of both kinds; which though it continually augment the natural Heat of the Blood, nor ever comes to an abſolute *Apyrexia*, no not ſo much as *quoad ſenſum*, before it be wholly judged or ended; and in that reſpect may pretend to a place among *continual* Fevers: Yet hath certain *Exacerbations* and *Remiſſions* of burning by Intervals, and thoſe ſometimes only every Day, ſometimes every Third, ſometimes only every Fourth; and in that reſpect ſeems to belong to *intermittent*. Hence it is, that ſuch a Fever is call'd a *continual Quotidian*, or a *continual Tertian*, or a *continual Quartan*, according to the time of its *Exacerbation*, or grieving anew.

Beſides theſe three kinds of ſimple Fevers, Phyſicians have in all former Ages believed, that there are others, *compounded* of two or more intermittent. Of this ſort are ſuppoſed to be.

(1) *Double*, or *Triple Quotidians*; when on one and the ſame Day, two, or three Paroxyſms invade, in proportion reſpondent each to other ſucceſſively.

(2.) *Tertians double*, or *triple*; believ'd hitherto to conſiſt of two, or three *Tertians*, whether in a double, two Paroxyſms return in one Day, or ſingle Paroxyſms recur every third Day: Or whether in a Triple, two Fits come in one Day, and a third on the next Day after; or three in one Day, and none the next Day. An intermittent Fever of this ſort is diſtinguiſhed from a *ſimple Quotidian*, by the time of its Invaſion, by the time of its Duration, and by the Symptoms that are wont to accompany it. For, in all theſe Circumſtances, the *firſt* Paroxyſm anſwers to the *third*, and the *third* to the *fifth*; but the *ſecond* is reſpondent to the *fourth*, and the *fourth* to the *ſixth*, and ſo forward. Whenſoever therefore we ſhall obſerve this Analogy betwixt the Paroxyſms alternately invading, we may with confidence pronounce, that the Fever is of that ſort, which Phyſicians call a *double Tertian*. When we obſerve on the other ſide, that the firſt Fit is in all things like the ſecond, the ſecond like to the third, and ſo forward through the whole courſe of the Fever; we may certainly judge, that the Patient labours under a *ſimple Quotidian*. Beſides these Characters of Diſtinction, Phyſicians have recorded one more, and 'tis this: If a ſimple Tertain hath preceded; recurring every third Day, and after return every Day; we may be ſure, the Fever is of that kind which heretofore hath been taken for, not a ſimple *Quotidian*, but a *double Tertian*.

Here perhaps ye will interrogate me about a *Simple Quotidian*, ſo frequently mentioned by me; namely, *Whether there be any ſuch thing in Nature, or not?* And ye have reaſon, there being a kind of Civil War among the Sons of *Æſculapius* upon the Queſtion. For ſome of the Princes among them have with great eagerneſs contended to blot out of the Catalogue of Diſeaſes, the very name of *Quotidian*, as if really there were no ſuch intermittent Fevers: And others no leſs renowned, as fervently, but ſomewhat more modeſtly, maintain, that of Six Hundred Sick Men that ſuffer new Paroxyſms every Day, ſcarce one is afflicted with a *Quotidian*. I *anſwer* therefore, that true it is indeed, that a *Quotidian* hath been by ſome Authors, of great Fame, baniſhed into the darkſome Iſland of *Chimæras*; but unjuſtly, and by thoſe who being carried away by Prejudice, and the Authority of their Predeceſſors, rather than conducted by the light either of certain Experience, or of right Reaſon, have by their Prevarication entangled their Followers in a groſs and dangerous Error: As I hope to evince, when I ſhall come to explain the Cauſes of intermittent Fevers in particular; if what hath been delivered juſt now of the diſtinct ſigns of *Quotidian*, be not thought ſufficient to end the Diſpute. For now I muſt haſten to the

third ſort of ſuppoſed compound Intermittents, *viz.* (3.) *Quartans*, *Double*, or *Triple*. For as often as it happens, that a Sick Man, remaining free from a Fit only one Day, is afflicted with two new Fits on the two days next following: So often it is concluded, that he hath a *double Quartan*. And when a new Fit recurs every Day; but ſo, that the firſt Fit anſwer to the fourth, the fourth to the ſeventh; the ſecond to the fifth, and the fifth to the eighth; in fine, the third to the ſixth, and the ſixth to the ninth, and ſo forward: They conclude, that of a ſimple *Quartan* produced, firſt is made a *Double*; and then of a Double, a *triple* Quartan. And this ſeems to be confirmed (as *Sylvius* rightly obſerves) ſometimes from the reaſon of *curing* ſuch Fevers, *viz.* if one Fit be firſt taken away, and then on the two conſequent Days the Fits yet return, one day of intermiſſion interpoſed; or if two Fits be taken away, one only remaining, and returning every fourth Day: But more frequently from the Symptoms, namely, the ſhivering, quaking, long-laſting cold, *&c.* which being more proper to Quartans, ſeldom occur in Tertians, and never but where the Tertians decline toward the Nature and type of Quartans.

Beſides all theſe ſorts of intermittent periodical Fevers, there have been obſerved *others*, intermittent alſo, but of uncertain Periods; which they have therefore named *Inordinate* and *Wandering* or *Erratic*.

Having thus briefly run through all the moſt remarkable Differences of putrid Fevers, Simple and Malignant, Continual and Intermittent, Ordinate and Inordinate, ſingle and double or triple; and deduced the Cauſes of thoſe Differences from Diverſity of Febrile Ferments operating upon the Blood, either without or with intermiſſion, at certain or uncertain Intervals: purſuing the *Gliſſonian Hypotheſis* I deſign'd to aſſert and explain; it remains, that to prevent Misunderſtanding of what hath been ſaid of the *Duplication* and *Triplication* of intermittent Fevers, according to the vulgar Doctrine of Phyſicians, as if I adhered thereto; I repeat what was before ſaid of that Point: namely, that when a double or triple Intermittent follows upon the Heels of a Single, the ſingle is not (as hath been heretofore believed and taught) the direct cauſe of the double or triple: But the double or triple ariſes from the Cauſes of its own, like to thoſe whence the ſingle at firſt aroſe. So that every double or triple intermittent ought to be accounted for two or three ſingle or ſimple intermittents of the ſame Species, alternately complicate among themſelves.

Corollarium Therapeuticum.

MY *Pathalogick* Diſquiſition being now at length ended, before all the Sands in my Hour-glaſs are fall'n down; I cannot (as I think) imploy the ſhort remainder of my time more profitably, than if I ſubjoyn a brief *Therapeutick Corollary*, pertinent to my precedent Diſcourſe, and uſeful to younger Students in Medicine; for whoſe inſtruction chiefly it was, that the wiſe and prudent Authors of the Statutes of this our ſo worthily renowned *College* firſt inſtituted and ordained *Anatomick Lectures* to be therein read by the learned *Fellows* thereof, whenſoever it ſhould ſeem fit to the venerable *Preſident*.

I will therefore do my devoir to explicate, wherein chiefly conſiſts that *Pepaſmus* or *Concoction* of crude Humours, which Nature, and her great Miniſter, *Hippocrates*, require to their opportune Evacuation in putrid Fevers; and by what kinds of *Remedies* the ſame may be beſt aſſiſted and advanced. For, theſe things being well underſtood, will afford much of Light toward the direction of the younger Sons of Art, in the true and moſt rational Method of *curing* Fevers; in which no error can be little, no caution too great.

I begin from that never to be forgotten precept of the *Divine Old Man*, afore recited: *Concocta medicamento purgare oportet, ac movere; non cruda; neq; incunte morbo, niſi materia turgeat.* To which *Seneca* ſeems to have had reſpect, when he ſaid, *in morbis nihil eſt magis periculoſum, quam immatura medicina:* And *Livy*, when he affirmed, *Medicos plus interdum quiete, quam movendo & agendo proficere.*

The *Concoction* or Digeſtion here meant, is by *Hippocrates* expreſſed ſometimes by the word πέπανσις, ſometimes by πεπασμὸς, to

contradiſtinguiſh it from πέψις, which properly ſignifies the Digeſtion of Aliment; as I have before Advertiſed: And according to the general Notion of all learned Phyſicians, Antient and Modern, it is, *eorum quæ ſunt in corpore præter naturam, ad moderatam & ſecuturæ expulſioni percommodam temperiem deductio.* In which Senſe *Duretus*, the moſt faithful interpreter of the Oracle of *Cous*, expounds that place (*Lib.* 1. *Epidem. Anutii Foeſii edit. Pag.* 365.) *eorum quæ exeunt, concoctiones ſpectandas eſſe.* Upon which *Galen* copiouſly commenting, gives this memorable definition of the thing: *Nempe coctio eſt quædam eorum quæ ſunt præter naturam, morbi maturatio.* And moſt rightly. For the Word πεπασμὸς, was *properly* uſed by the *Grecians* to expreſs the *Ripeneſs* of the Fruits of Trees, by which they are advanced from the State of Crudeneſs or Immaturity, to that of Maturity or Perfection; and *metaphorically*, to ſignifie that of the matter of Diſeaſes, which Nature by degrees induces, in order to the ſeaſonable and beneficial Expulſion of it, when ſhe attempts a *Criſis* by ways moſt convenient.

Not that this Maturation is *always* to be expected in acute Diſeaſes. For we are to remember, there are two ſorts of *Crudity* of Cauſes apt to induce Fevers: *One* capable of being brought to moderation and ripeneſs; as that of the Blood in a *Phlegmon*, of the Phlegm in a *Quotidian*, of Choler in a *Tertian*, *&c. Another*, incapable of Correction and Mitigation; as the Febrile Ferment that cauſes *Malignant* and *Peſtilential* Fevers, which being by its ſeminal Nature and unalterable Form, pernicious to the very principle of Life in Man, is ſometimes by the force of Nature expelled and utterly exterminated out of the Body, but never can be ſo changed and brought into ſubjection, as to be made leſs Hoſtile to the vital Spirits that conſerve the Blood. And therefore in ſuch Fevers, wiſe Phyſicians are not wont to ſtay expecting Maturation of the Poyſon mix'd with and fermenting the Blood, in the mean time loſing the Opportunities of relieving Nature by proper *Alexiterial* and *Sudorifick* Remedies.

To come then to the Marrow of the *Queſtion* propoſed. Conſidering: (1.) That the Crudity of Humours inducing Fevers ſimply putrid, conſiſteth only in this, that t Spirits lodged in them are ſufficiently Ed cated, Excited, and Prepared, ſo as to be to promote the vital Mication of the Bloo (2) that all Fevers are eſſentially founded the Fermentation of the Blood; and (That the vital Motion or Heat of the Blo is always more or leſs impeded and pertu bed, and often utterly extinguiſh'd by th Fermentation: Conſidering theſe things, ſay, 'tis not difficult thence to infer, th the *Pepaſmus* or *Concoction* requiſite in all F vers ſimply Putrid, *i. e. not Malignant*, mu conſiſt chiefly in three things *è diametro* o poſite to thoſe now mentioned; namely (In the *Diſſipation and Conſumption* of the cr *Spirits* mix'd with the Blood; (2.) In t *Moderation* of the *Fermentation* begun; a (3.) in the *Conſervation* and *Corroboration* the *vital Powers*. And theſe certainly a the three principal Scopes to which a Phy cian ought to direct his Counſels, in t cure of putrid Fevers; and which for th great Importance, require to be ſingly e plain'd.

To the *firſt* of theſe principal Scopes, v the *Diſſipation* and *abſumption of the crude S rits*, and requiſite eventilation of the Blo by them inquinated, we may moſt comm diouſly attain, by Faſting, at leaſt by thin Diet; by Remedies extenuating, ac predatory and conducing to leanneſs; Diaphoreticks, Sudorificks, and by letti of Blood. For (1.) *Faſting* tends direc to diſſipation of the crude Spirits; beca the Spirits, if not by intervals recruited o of new Supplies of Aliment, muſt neces rily be ſoon exhauſted and reſolved in Air. But no Mortal being able long to a ſtain from all ſorts of Meat and Drink, to endure abſolute Faſting; we are there compell'd to ſubſtitute a *thin and ſpare D* in the place of ſtrict Abſtinence; for the m part thin Broths made of things moyſtni cooling, not prone to Corruption, Suba and of eaſie Digeſtion. To theſe (2.) are ad moderate and grateful *Acids*, apt to atte ate, reſolve and diſſipate the Crudities o geſted in the Habit of the Parts, and th fore Predatory. (3.) *Diaphoreticks*, wh promoting inſenſible Tranſpiration, m conduce to the diſperſion and exhala of the ſame Crudities. (4.) *Sudorificks*, wh

to the ſame thing, but by a more expedite and conſpicuous Operation, at once rendering the Crudities Fluxile, and exciting Nature to drive them forth by Sweat. For Medicaments of this Family, by the tenuity and mobility of their Particles, penetrate the inmoſt Receſſes and ſlendereſt Pores of the Body, cut, attenuate and rarefie Humours into Vapours, and irritate the Parts to expel them together with the *Serum* of the Blood, in the form of Sweat. But in the uſe of theſe *Hydrotick* Medicaments great Circumſpection is required, leſt the Matter of the Fever, being not yet mature and prepared for this Evacuation, be both importunely with too much Violence Exagitated, to farther corruption of the Blood, and increaſe of the Fermentation. So that they cannot be ſafely adminiſter'd to impure Bodies, in the beginning, nor indeed in the Augment, until certain Signs of ſome Concoction have been obſerved. (5.) *Letting forth of Blood* by opening a Vein, which evidently detracts part of the Crude Matter floating in the Blood, and makes room for the remainder to be more freely Fermented, and prevents Eruption of the Blood out of its Veſſels into ſome Noble Part.

To ſatisfie the *Second* capital Intention, various things are required; *viz.* ſuch as may *facilitate* the Motion of Fermentation in the Blood; ſuch as may *moderate* the ſame, when it is exceſſive in point of Velocity; ſuch as may incite Nature to quicken and *accelerate* it, when too ſlow; ſuch as may keep it within due Bounds, leſt it bring a dangerous flood upon any Noble Part. For, the Motion of Fermentation is ſometimes too *Turbulent* and Tumultuous, and in that reſpect exceedingly *Laborious*, requiring remedies to make it more ſedate and eaſie: Sometimes too *dull* and *ſlow*, and to be quickned; ſometimes it threatens a *Flux* upon ſome Nobler Parts, and then ought to be reſtrained. In particular, (1.) The *Laborious* Fermentation (which the Ancients ſeem to have meant by the name of *Orgaſmus* or *Turgeſcentia*) indicates Remedies apt to compoſe it, and render it leſs prone to moleſt and offend the Veſſels containing the Blood: Such as taking away ſome by *Phlebotomy*, which by diminiſhing the Maſs, leſſens the burden of Nature, and makes room for the freer Fermentation of the reſt, ſuch alſo are *Acids* and *Refrigerating*, and *moiſtning* Juleps (not given actually Cold, but Luke-warm, nor in the leaſt vinous) all which allay the ebullition of the Blood, and make it leſs prone to be Frothy. (2.) The *too ſwift* or vehement Fermentation, which makes the Fever more acute than the ſtrength and ſpirits of the Patient can well bear, and by conſequence ought to be moderated; requires Remedies that may ſomewhat *retard* it, and procure a truce to Nature, that ſhe may have reſpite to recollect and rally her Forces. Of which ſort are *Blood-letting*, *Anodynes*, *Hypnoticks*, and ſometimes even *Narcoticks*, either taken in the Mouth, or applyed outwardly to places convenient.

(3.) On the contrary, the *too ſlow* and lingring Fermentation, ſuch as cauſes *Lent* Fevers, calls upon the Phyſician for Spurs to incite and ſtimulate Nature to accelerate the Conflict. In this caſe therefore he ought to have recourſe ſometimes to *Purging* Medicaments, to be by Intervals Repeated; ſometimes the *Sudorificks*, and thoſe pretty Hot, Efficacious, vinous or rich in Spirits: For all theſe *quicken* the Fermentation, and diſſolve the clammineſs of the Febrile Matter, and in both thoſe reſpects bring great Relief to the Patient. (4.) The *Turgent* Fermentation, which threatens a Flux upon ſome noble part and imminent danger thereupon; directs to the ſpeedy uſe of the beſt means for *Diverſion*. Here therefore the moſt urgent Symptom is without delay to be oppoſed, by Remedies *Revellent*, *Divertent*, *Repellent*; as *Phlebotomy*, *Cupping-Glaſſes*, *Leeches*, *Ligatures*, *Veſicatories*, and other *Topicks*.

In fine, the *Conſervation of the vital Powers*, is in putrid Fevers of greateſt Moment; becauſe the Febrile Matter tends directly to the oppreſſion of the vital Mication of the Blood, and the Fermentation it ſelf proceeds no leſs from the Luctation of Nature, endeavouring to continue that Motion in which life conſiſts; than from the Ferment that hinders it. Hence it comes, that the lighter cauſes of Fevers are ſometimes diſcuſſed by *Cardiacks* only, by a bitter Decoction of Chamomil Flowers, and the tops of Wormwood, by *Carduus Benedictus* boiled in Poſſet-drink, and the like *Euporiſta* or

dome-

domeſtick Remedies. For, if the expanſive Motion of the vital Spirits be ſo far aſſiſted and corroborated, as to enable it to overcome the clammineſs of the Febrile Ferment, that tends to the ſuppreſſion of it; Nature certainly will ſoon obtain the Victory, and eaſily exterminate her Enemy. Here then is the opportunity of giving *Cordials* (as they are call'd) *Antidotes*, and *Specificks* or *Appropriate* Remedies, vulgarly ſo named: All which conduce to the *Conſervation* of the *vital Faculty*.

Beſides the juſt now deſcribed preparation of the Matter in putrid Fevers offending, to the opportune expurgation of it, there is required alſo a certain preparation of the *Ways* or Paſſages, through which the ſame is to be moſt commodiouſly carried off, that ſo the Evacuation, whether by Nature her ſelf critically, or by her Miniſter the Phyſician artificially inſtituted, may be not only ſeaſonable, but eaſie too and beneficial. For, theſe being, either by their *Aſperity*, or by their *Narrowneſs*, or by *Obſtruction*, leſs paſſable than they ought to be; to attempt Purgation, is vain and unſafe. Of which our Law-giver, *Hippocrates*, being fully conſcious, left us this moſt prudent Counſel (*Aphor.* 10. *lib.* 2.) *Si quis corpora purgare voluerit, meabilia ut reddat, eſt neceſſe.* But how is the Body to be made more permeable? By opening all the Paſſages of it, and by cutting, diſſolving and attenuating the groſs and viſcid Humours that ſtick in them: Which may be beſt effected, by Remedies *Lubricant*, *Abſtergent*, and *Aperient*: The particular reaſons of all which I ſhall endeavour briefly to explain.

(1.) *Lubricantia* certainly render the ways more fit to give Paſſage to Humours that require Purgation, by ſmoothing their roughneſs, and inducing inſtead thereof a manifeſt *Slipperineſs*; ſo that the Humours ſlide along through them without any ſenſible Renitency or Attrition, which always cauſeth *Gripes* in the Stomach and Belly. Now of theſe Medicaments that are apt to induce Slipperineſs, ſome are ſimply *Aqueous*, and remove Aſperity only by their Moiſture, as Barley-water, thin Broaths, Whey, *&c.* Others are *Mucilagineous*, ſmoothing the Ways with a certain friendly and pleaſing Lentor, as the Syrups of *Althæa*, of the Flowers of Mallows, *de Mucilaginibus*, of Jujubs, *&c.* Others *Oleagineous*, as Oil of Sweet Almonds, Linſeed Oil, Freſh Butter, Lard, *&c.* Others, *Saline*, as the Salt, Cream, and Magiſtery of Tartar. Others, *Spirituous*; as New-laid Eggs, but little boiled, the Pulp of ripe Fruits. Again of theſe, ſome *looſen* the Belly alſo; as the Pulp of *Caſſia* and *Damaſco* Prunes, which above all things contemperate the roughneſs of purging Medicines, being for that reaſon chiefly admitted into the compoſition of the *Diaprun. Solut.*

(2) *Abſtergentia* ſeem to have the like good effect, in facilitating the Operation of purging Medicaments; as Soap hath in cleanſing of Linnen. For, whatſoever ſticks to the inſide of the Stomach and Gut, they wipe away; and are found, in that reſpect perhaps, to conduce much to the correction of ſtrong and churliſh Catharticks; by preventing their rough and grating Particles from pertinaciouſly adhering to the Coats of the Ventricle and Inteſtines, and ſo inducing Gripes and Contorſions. Hence 'tis familiar to Phyſicians to tame fierce Purgatives with Salts, *viz. Sal Gemmæ*, Salt of Tartar, of Nitre, Spirit of Vitriol, and of Nitre dulcified, *Cremor Tartari*, and the like. Not that they conſer to the bridling of the fierceneſs of ſtronger Catharticks in this name only, but becauſe they are uſually preſcribed chiefly to this end.

(3.) Nor are *Aperient*, i. e. cutting and attenuating Medicaments of leſs Utility in this Buſineſs, where the ways through which peccant Humours are to be educed, are obſtructed by any vitious Matter cramm'd into them. For, Remedies of this *Claſſis*, by reaſon of the great Tenuity, acuteneſs and agility of their Parcels, penetrating into the ſmalleſt Veſſels and Pores, and attenuating viſcid and tenacious Humours therein ſticking, open all Paſſages in the Body. No wonder then, if by rendering the clammy Matter of Fevers more Thin, Fluid, and more obedient to Nature, endeavouring upon irritation by Purgatives, to expel it; they conduce mightily to the more Facile, and more ſucceſsful Operation of Purges. Nevertheleſs, we are to advert, that not all ſorts of Humours are to be Fluxile, before any

y be exterminated by artificial Purgati-
n: But that we are, in pertinacious ob-
ructions of the *Viſcera*, to act with *Aperi-*
s and gentle *Cathartick*s by turns. For,
there are degrees of Concoction, ſo like-
iſe ought there to be degrees of Evacuati-
n; and ſo ſoon as any part of the peccant
atter is decocted and prepared; we muſt
tempt to carry it off; to the end that Na-
re being thereby exonerated of part of
r Load, may with more Facility digeſt
e Remainder; at leaſt when we perceive
r to be oppreſſed by too great Weight. Of
perients ſome are *Hot*, which ought to be
miniſtred to Men of robuſt Bodies, and
ld Complexion, and ſuch as labour of in-
terate Oppilations: Some *Cold*, which are
oper for perſons of hot Conſtitutions, and
one to abound to bilious or cholerick Hu-
ours: Others *Temperate*, and therefore
oſt convenient to tender, ſoft, delicate and
azy Bodies. But theſe three ſorts being
diciouſly contemperate, mutually refract
ch the others Qualities, ſo as to reduce
em to Mediocrity. Other differences of
perients there are, which I muſt lightly
uch. *Some* remove Oppilations by *attenu-*
ing ſimply, without the leaſt of Aſtricti-
n; as the five opening Roots, the Bark of
amariſc, and of the Roots of Capers, the
eaves of Maiden-hair, Hearts-tongue, Ce-
rach, and Fern Roots, *&c. Others* both
en, and *moderately bind*; as Endive, Ci-
ory, Agrimony, Rhubarb, Sage, *&c. O-*
ers again are endowed with an aperitive
aculty, but are withal *vehemently Aſtrin-*
nt; as Steel, which hath no fellow. Now,
to the ſeaſonable *uſe* of theſe Differences;
the *beginning*, Aperients without Aſtri-
ion are moſt convenient, becauſe they beſt
iſpoſe the Humours to Fluxility, and clear
e Paſſages: Yet are they to be preſcribed
ith this Caution, that the tone of the
arts be not by the importune uſe of them
ſſolved, or irritated to a Cruentation. The
ſer way therefore is, to mix with them one
two of the *ſecond* Tribe, that have ſome-
hat of Aſtriction in them. Aperients *mo-*
rately Aſtringent, are indeed in themſelves
oft ſafe; but they are given with beſt ſuc-
ſs after a general Evacuation. And more
hement Aſtringents are to be in reſerve, to
finiſh the Cure, by reſtoring the weakned parts to their priſtine tone and vigour.

But is it not plainly diſſonant to reaſon, ye will ſay, that the ſame Remedies ſhould be once both *Aperient* and *Aſtringent*? I *anſwer*, therefore, with Doctor *Gliſſon*; that *Aperients* and *Aſtringents* are not directly *oppoſite* each to the others. For, the contraries to *Aperients* are *Obſtruents*; and to *Aſtringents*, *Laxants*. Beſides, in a Chachexy and Dropſie, which either proceed from, or are commonly accompanied with great Obſtructions; the natural tone of the Parts is always relax'd more or leſs. It muſt be confeſſed indeed, that in thoſe Maladies the tenſion of the Nerves is for the moſt part too great, by reaſon of their continual irritation by vitious Humours: But nevertheleſs it cannot be denied, that their natural tone is leſs firm than it ought to be. If therefore *Obſtruction* may conſiſt with *Laxity*, why may not *Deoppilation* as well conſiſt with *Aſtriction*?

And thus have I run over the three principal things prærequiſite to Evacuation in putrid Fevers, *viz.* correction of the peccant Matter, conſervation of the vital Mication of the Blood, and permeability of the ways. It remains only, that I adjuſt what hath been ſaid, to a certain Rule of *Hippocrates*, that ſeems to render it doubtful. The precept is this (*Aphor. 29. lib. 2.*) *Ineuntibus morbis, ſi quid movendum videatur, move*: Which ſome perhaps may think plainly repugnant to the former Aphoriſm, upon the explication whereof I have ſo long inſiſted.

To reconcile therefore theſe two equally true Aphoriſms, I muſt acknowledge, that it is *not always* requiſite to expect a *Pepaſmus*, or maturation of the morbifick Matter in Fevers ſimply putrid. For, there are various caſes, in which, whether they happen to be ſingle or concurrent, all the counſel of this latter Aphoriſm is to be preferred to that of the former. And all theſe Caſes may be reduced to the number of Five.

The *firſt* is, when any vitious Humour, either by its abundance, or irritating Quality, or motion doth moleſt the Patient, in the firſt region of the Body, that is, in the Stomach, or Guts, or Pancreas, or Liver,

&c.

&c. which requires to be ſpeedily expelled upward or downward. For 'tis not to be doubted, but that a Phyſician may, and ought, in this caſe, to relieve moleſted Nature, as ſoon as is poſſible, by carrying off the irrequiet Humour by ways moſt convenient. And by the Oracle of frequent experience we are taught, that not only intermittent, but continual Fevers alſo, are much diminiſhed, if not totally eradicated by ſafe Vomits or Purges adminiſtred in the beginning. For, the fovent cauſe being taken away, the proximate cauſe is much more eaſily diſcuſſed; which ſeems not to be any Humour ſtagnating or congeſted, either in the *Viſcera* themſelves, or in their Confines, as hath been already ſhewn; but floating in the Maſs of Blood within the Arteries and Veins. This therefore is not to be attempted by any purging Medicament, until Concoction hath preceded: And the *latter* Aphoriſm adviſing Purgation in the beginning of putrid Fevers, is reſtrained to crude Humours contained in the firſt Region of the Body; nor doth it reſpect the times of Diſeaſes, ſo much as the ſtrength of the Sick, (which is very rarely exhauſted in the beginning) according to the judgment of *Galen* (*lib. ad Thraſybulum, cap.* 38.) who gives this reaſon of the Aphoriſm, *Quod natura, adhuc ſatis valida exiſtens, detracta oneris quo premitur, parte, quod reliquum eſt & facilius ferre, citiuſque concoquendo mitigare poſſit.* Hence it is, that not only *Clyſters*, that rinſe the Guts, but gentle *Solutives* alſo, ſuch as may without any great Tumult or Commotion carry off any vitious Humour lodged in *primis viis*; are commended by the moſt experienced Phyſicians in the beginning of putrid Fevers.

The *Second* caſe is, when any Matter incapable of mitigation by Concoction, begins to ſhew its *Turgeſcence*, i. e. either from its abundance, or from its malign Quality, flying from place to place, induceth a frequent Mutation or ſhifting of Symptoms: All which *Hippocrates* comprehended in the Word ὀργὴ, which ſignifies *Rage* or *Fury*. Which for the moſt part happens in the beginning of the Fever; and then ariſe various Symptoms, and dangerous, according to the various Temperament, Irritability, Action, Uſe, and Situation of the part upo which the turgent Matter ruſheth. As f inſtance, in *Phrenetick* Patients we obſer an admirable change of Symptoms; ſom times their Sight, ſometimes their Hearin ſometimes their Tongue being invaded a diſordered by the wandering Humour th cauſes their *Delirium*, and often ſhifts t ſcene of its tragical Fury. And the Reaſo ſeems to be this, that the inraged Matter the Diſeaſe is ſo highly offenſive to Huma Nature, that no part of the whole Bod can ſuffer it ſo much as one moment of tim without uniting the Forces of all its irrit ted Fibres to ſqueeze it out, ſo that it tranſmitted from ſome parts to others in Trice. If it happen therefore, that a crude Humour be in this impetuous manı tranſmitted to any *Secretory* Organ (ev though it be not redundant in the wh Body) a conſiderable part of it may be, help of purging Medicaments, reſpective that Organ, ſpeedily carried off to the p ſervation of the Patient's Life. For, t Humour, ſo Turgent, and ruſhing into t Organ, doth by its very Motion irritate t Fibres of it to contract themſelves vig rouſly to expel it; no leſs than if it w redundant in the whole Body. If the ſto then fall upon the *Stomach*, the dan thence impendent may be eaſily preven by a moderate *Vomit*, given before the H mour be removed to ſome other Part; upon the *Guts*, a convenient *Purge* m ſerve to turn it downward. And yet I m confeſs, that ſuch early Evacuations commonly Tumultuous and Painful; promiſcuouſly educing all Humours t meet with; and therefore never to be in tuted, but where the Matter of the Diſ is Turgent.

The *Third* caſe is, when ſome little P tions of any one, or more of the *Analo* Humours formerly deſcribed, chance t carried, together with the ſtale and dead re ments of the Blood, to the *Secretory* Org In particular, when ſome of the acrim ous and corroding *Serum* of the Blood by nature therewith offended, tranſmit together with the *bilious* Excrement of it the *Liver*: Or ſome of the whitiſh viſcid *Grumus* of the Blood, together

the *Pituita emortua*, to the *Stomach*; or finally, ſome of the *aqueous* or potulent Matter, with that of the *Urine* to the *Kidneys*. Becauſe Nature tends that way, and being aſſiſted by a convenient *Purge* in the *firſt* caſe; in the *ſecond*, by a gentle *Vomit*; and by temperate *Diureticks* in the *third*; may continue the ſame courſe, until ſhe has brought the remainder of the peccant Matter to a perfect *Criſis*.

The *Fourth* is, when any vitious Matter yet crude, is ſo redundant in the Blood, that nature, reduced to her laſt ſhift, is compelled to exclude it by Parcels, by any *Secretory* Organ, not by that which is moſt proper and congruous to the Nature of the Humour. As it happens in the *Yellow Jaundice*, when part of the corrupt *Choler* is ſeparated from the Blood in the Kidneys, and makes the Urine Thick, Turbid and Yellow: And in that dreadful Diſeaſe call'd *Cholera*, and all the *Bilis* ejected upward and downward, is not concocted and truly Felleous, but for the greater part crude and only analogous to that which is ſeparated from the Blood in the Liver, and thence brought into the Bladder of Gall, and ſeems to be generated by a certain malign or venenous corruption of the Blood. For, improbable it is, that ſo prodigious a quantity of bilious Matter hath been ſeparated from the Maſs of Blood in the inmoſt Coat of the Stomach and Guts. In like manner, they who drink Mineral Waters, or Wine profuſely, make Urine indeed in abundance, but thin and crude.

The *Fifth* and laſt Caſe is, when the Febrile Fermentation appears to be ſlow and lingring. For, here 'tis lawful, by juſt intervals, to ordain Evacuations by milder Catharticks; not only in reſpect of the *Focus*, which in ſuch caſes is wont to be recruited often, and therefore requires to be ſubſtracted by repeated Evacuations; but alſo that the Fermentation it ſelf may be quickned, and ſo nature excited to perform her work of digeſting the Crudities with more Vigour and Expedition.

A Continuation of Fevers in general and particular: From Mr. Chaillon's *enquires of the Origine of the Motion of the Blood, and other Humours in the Humane Body:* Michaelis Praxeos Chimicæ Generalis, Willis, Sydendam, Morton, *and* Cole *of* Fevers, Small-Pox, Meaſles, *&c. With an account of the* Cortex, *and ſome other Specifick's; From* Paxton, *&c.*

THE Fever in general is a foreign Heat and diſorderly Motion of the Blood, which being contrary to nature endeavours to deſtroy it by attacking the Heart, then the other parts of the Body, where being diſtributed by the Arteries, with the Blood and vital Spirits, diſturbs or interrupts their Functions.

The *Fever* is divided by *Galen* into three Parts, becauſe of the three ſubjects where the igneous heat is ſaid to reſide. In the *Ephemera Fever*, when there is an Inflammation in the Spirits; in the *Humorale* when the Fire is in the Humours, and in the *Hectick*, when in the ſolid Parts.

We ſhall eſtabliſh three general Heads, under which all Fevers may be rang'd; Namely, the Simple, the Putrid, and the Peſtilent Fever. The Simple Fever is an Inflammation, or an exceſs of Heat that is preternatural, without Putrefaction, of which there are three kinds; the *Ephemera*, the *Synochus*, and the *Hectick*. The *Ephemera* is an Inflammation or Diſorder that chiefly effects the Spirits, by which it is communicated to the whole Body; but the ſubſtance thereof being thin, ſubtil and airy, it vaniſhes and eaſily diſperſes it ſelf, and ſeldom laſts above a Day; we divide this into two, to wit, the True and the Falſe.

The Simple *Synochus* is generated from the efferveſcence of the Blood which is too hot in the Veins and Arteries, always without Corruption; it laſts longer than the *Ephemera*, becauſe the matter affords more Reſiſtance. The *Hectick Fever* is a preternatural Heat, adhering cloſe to the ſolid Parts. There are two ſorts of this, the one Univerſal, whoſe principle ſeat is in the Heart, from whence it is convey'd to all the parts of the Body; the other is Symptomatick, and is lodg'd in ſome particular Part, as the Lungs, the Liver, the Stomach, Spleen and Reins, which communicates it ſelf afterwards to all the other Members. There are ſeveral degrees to be obſerved in this *Fever*, the firſt is when the moiſture which is a Dew with which the parts are water'd is dry'd up: The ſecond degree is when the ſubſtance of the Fleſh is waſh'd away: And the third when the heat drys the fibrous and ſolid Parts: It is ſtill to be obſerved that the *Hectick Fever* is ſometimes Simple, and ſometimes attended with a *Putrid Fever*.

The *Putrid Fever* is formed from a corrupted Humour which ſeizes firſt on the Heart, afterwards on the other Parts; of which there are two ſorts, to wit, the Continued and Intermitting. The continued is of one or two kinds, the one true and eſſential, and the other Symptomatick: The true and eſſential continued Fever is not confined to any particular Member, but is contained in the large Veſſels, and from thence by its Energy, powerfully infects the Heart without Intermiſſion, and conſequently the vital Spirits, with theſe differences. The firſt *Putrid Synochus* which without encreaſe of Fever takes its Orig from an equal mixture of the Fluids, are put into the like efferveſcence: The cond *Synochus* or continued Periodical Fe has ſome increaſe, and ſome relaxation certain Days, but altogether without In miſſion: This difference ariſing from diverſity of the Motion of the Humo which ſtill end in a Putrefaction: T make ſtill a third difference, to wit, Tertian or continued Bilious Fever, Quartan or continued Melancholy, and Quotidian or continued Pituitous Fe All the continued Fevers are either e from the beginning to the end, or elſe encreaſe or decreaſe.

The Symptomatick Fever proceeds f the Obſtruction, Inflammation, or Corr tion of ſome of the *Viſcera*, and from th communicated to the more Noble Parts is greater or leſſer, ſtronger or weaker, cording to the part from whence it co or wherein it is ſeated: Theſe Sympto tick Fevers, ſometimes attend *Phlegm Eryſipelas*, large Wounds, Inflammati and Obſtructions; they likewiſe come f Worms, corruption of the Milk, *Se Fluor Albus*, &c.

As to the imtermitting Putrid Fever is either Simple, Compound or Confu and its ſeat is amidſt the *Viſcera* of the l er Belly, which contains the parts tha water'd by the Branches of the *Vena P* and by thoſe of the Cæliack and Meſe rick Arteries, as the Stomach, the Epipl the Gall Bladder, Spleen, Pancreas, Me tery and Inteſtines. The Simple is div into the Tertian, Quotidian, Quartan, ſome add the double Tertian, which fifth Day, the Seventh, the Ninth, an that have any Intermiſſion, but theſe much rarer than the three firſt; all *Fevers* are called *True* or *Falſe*.

We muſt ſuppoſe that for an Intermi Fever, ſome heterogeneous thing is with the Blood, whoſe Particles in re they are not aſſimilated, make ſo lon ebullition of the ſame, till either being dued, they are rendered unſoluble, or ſubtilized, they are ſent forth; whe ſuch Matter being ſubdued or ſent fort Fit ceaſes; and when this Matter ſpri

es a freſh, it cauſes a new Ebullition, and nſequently a new Fit happens. Secondly, s to the ſhivering and cold, preceding the at in this effect, doubtleſs the true and nuine cauſe of thoſe is the flowing and rgency of the nervous Juice degenerated to another Nature, wherewith the Spirits d Heat being charged are abounded, and e nervous Bodies being irritated are put to a Trembling; but afterwards when eſe Particles, being in part protruded to e ſuperficies of the Body, the Blood is mewhat freed from their Cumbrance and ppreſſion, and joyning with the *Serum*, ey evaporate by Sweat, or inſenſible Peration. Thirdly, From what is ſaid, it ill be eaſie to ſhew the cauſes of the Inrmiſſion, and of the ſet Returns, *viz.* the termiſſion follows becauſe the Morbifick atter is all clear'd at one Fit, and ſo till new one be brought in place, an interiſſion follows of neceſſity. Now a new atter begins to be generated from the time at the laſt Fit ceaſed, and when the Blood fill'd again to a Turgeſcency, it boils and mes to a flowing.

As to the ſet returns of the Fits, theſe ppen becauſe for the moſt part the nutrive Juices is ſupplied from the *Viſcera* to e Blood paſſing in the Veins in an even eaſure and Quantity, though ſometimes the Perſons who have *Intermitting Fevers* rge themſelves too much, or are very abmious, the Fits happens ſooner or later an uſual. If it be ask'd wherefore the ſet eturns of Fevers are not of one kind, and the ſame diſtance, but that ſome come ery Day, ſome every third or fourth Day; e cauſe is the different Conſtitution of the lood, whereby it is perverted from its due emper, into a ſharp, acid or auſtere diſpoion. According to this differing Dyſcraſie, e nutritive Juice freſh brought, falls more leſs from its Maturation, and is pervert- into a Matter ſooner or later apt to ferent.

We call a *Tertian Fever* not that which ppens at three Days diſtance, but inclurely from the day in which one Fit begins the third thence another returns; mean hile, ſometimes if the Fits are long, *viz.* otracted to 24 Hours, and withal come fore the uſual time of their Acceſſes, the ſpace of intermiſſion is often leſs than 24 Hours. The eſſence of a Tertian conſiſts in the ſharpneſs and heat of the Blood, which ſets the crude nutritive Juice like new Beer a fermenting, from whence proceeds firſt a cold with ſhivering, and afterwards the vital Spirits prevailing, a burning with intenſe heat through the whole Body, and then upon ſeparation of the Fluids after the conflict is over, the *Serum* is ſent forth through the Pores of the Skin, which we call Sweat.

A Tertian Fever is wont to be common in the Spring, when the Blood is moſt vigorous, and impregnated with Particles of Salt and Sulphur; but if this Diſeaſe continue, it is the cauſe of many Diſtempers; for hereby the Maſs of Blood is impoveriſhed, wherefore a Jaundice, Scurvy or Cachexy follow upon this Fever, when long a curing: For by the frequent Fits the Spirits evaporate, the Muſcles looſe their Spring, and the ſtrength decays. Beſides, a continuance of this Diſeaſe, often changes it into a Quotidian, Quartan, or double Tertian; all which tend to weaken the Body, and emaciate at laſt the Patient to a meer Skeleton.

Certain Symptoms are wont to happen upon this Fever, which are commonly reckon'd for the *Criſes* of this Diſeaſe; as *breaking out of the Lips*, a *Jaundice*, and a *Phlegmon*, ſuddenly raiſed in any part of the Body, though notwithſtanding ſuch irruptions of the Lips, the Fever has continued obſtinate ſometimes; wherefore it is to be obſerved, if upon ſore Lips, the *Fever* does not remit, it will prove of long continuance and ſevere. Sometimes a *Jaundice* happens upon a *Tertian Fever*, and puts an end to it, the reaſon is, becauſe when the Blood has gotten a ſharp or bilious Diſpoſition, that thereby it changes the nutritive Juice, it is often freed from that Dyſcracy, when by a ſudden Excretion, the recrements of the aduſt Gall are freely purged. When a *Phlegmon* happens upon this affect, it is commonly ſaid that the *Ague* is fallen into the place ſwoll'n: Now it is no ſtrange thing that the Diſeaſe is determined by ſuch an Abſceſs; becauſe the Blood by this means continually ſerves from it ſelf the ſtore of the degenerated Maſs, and conveys it to the part affected; ſo the Diſeaſe is ſometimes

help'd by a *Metaſtaſis* of the Febrile Matter from one place to another, as a Toothach, Deafneſs, or the like, happening on a ſudden.

As to the Cure, that the Blood may be reduced to its natural Temper, Vomits, Bleeding, and Purging are of great uſe, eſpecially in the beginning of the Diſeaſe. *Vomits* do good by forcing the Choler plentifully from the *Meatus Cholidochus*, emptying the Gall-bladder, and ſo cleanſing the Blood from the aduſt Bile; beſides they ſtrengthen the Stomach, and prepare it for a better Digeſtion. Opening a Vein cools and ventilates the Blood, and makes it circulate more freely in the Veſſels. Purging draws plentifully the Bile from the Gall-bladder, and viſcid Humours from the Coats of the Guts, and conſequently purifies the Maſs of Blood. The ſecond intention is perform'd by Diet, and a Regimen or Method of Living; ſpare thin feeding is the beſt, to put off the feveriſh acceſs beyond its uſual time, and ſometimes it will overcome the Diſeaſe; therefore thin Aliment is to be made uſe of, as Barleybroth with or without Fruit, and likewiſe ſuch as is made of Veal, Lean Mutton, an old Fowl, *&c.* In the third place the Fit is ſtop'd by Remedies, which check'd the fermentation of the Blood: And though this hath been look'd upon by Phyſicians, as Empirical, Immethodical, and the like, yet Experience ſhew that theſe Fevers have been often cured this Way; though you muſt obſerve that the uſe of theſe after Bleeding and Purging will do the moſt good; and unleſs theſe are duly premitted, thoſe others ſeldom ſtop the Fit.

By this plain and eaſie Method following, ſeveral Tertian Fevers have been cured in a ſhort time, *viz.* by purging, with an infuſion of *Sena*, and Rhubarb, in Whey, or Milk Water, with a Topical Febrifuge apply'd to the Wriſts, or a Plaiſter to the Pit of the Stomach, and at Night going to Bed give Conſerve of Roſes, half a Dram, Tartar Vitriolate 4 Grains, Diaſcordium a Scruple, and every Morning after Purgation half a Dram of Salt of Wormwood and Tamarisk in a Spoonful of Juice of Oranges. But if the Fever grow worſe and worſe and the diſeaſed Languiſh, *Cathartick*s being laid aſide, we ought to inſiſt on ſuch Medicines then as reſtore the dejected Strength, fuſe or dilute the Blood and drive away the ſerous Impurities by Urine, together with ſuch things as ſtrengthen the Tone of the *Viſcera*, and exhilerate or refreſh the Spirits: For this end Apozems of Diuretick, Aperitive and Stomachick Herbs and Roots are excellent; together with Alixipharmick, and Sudorificks, as *Lapis Contrayervæ*, *Virginia* Snake Root, Antimony, Diaphoretick, Salt of Tartar, and the Teſtaceous Powders: When the *Craſis* of the Blood is ſomewhat better, then Remedies may be profitably given for ſtopping the *Paroxyſm* or Fit of the *Fever*: For which purpoſe let *Febrifuge* Epithems be apply'd to the Wriſts and Soles of the Feet. The Peruvian Bark in ſubſtance or in Tincture, by the Mouth or in Clyſters; ſo Opiates of Laudanum, Liquid and Solid *Matthews* and *Hounds* Tongue Pills; alſo of the Bark of the Aſh, Tamarisk, or of Gentian, given in White-wine, with the Salts of Wormwood, *&c.*

Next after a *Tertian Fever*, by reaſon of their Affinity follows the *Quotidian*, which returns every Day: In this the Symptoms Heat and Cold are more Remiſs, but the acceſs holds longer, continuing ſometimes 18 or 20 Hours. This Fever frequently ſucceeds a Tertian; for when the Spirits are much ſpent, the Blood becomes weaker, and is not brought to Perfection, therefore ſooner converted into a Matter almoſt wholly ſubject to Fermentation. Sometimes it happens that a Quotidian Fever ariſes firſt without a foregoing Tertian, *viz.* when a feveriſh affect ſeizes a Body that is Cacochymical; for then the Blood being poor in Spirits perverts the nutritive in greater ſtore and ſo changes it into a Tertian. An intermitting Quotidian Fever is not ſo eaſily cured as a Tertian; for whether that come firſt Simple, or follows upon another, however it is raiſed from a ſtronger cauſe, and argues a greater Dyſcracy of the Blood which does not preſently yield to Remedies.

In this caſe Vomits, if the ſtrength will bear them, will be of uſe above the reſt; alſo purges muſt be often repeated, eſpecially ſuch as are made with the aperitive and bitt

bitter Herbs; as Rhubarb infuſed in Cinamon and Wormwood Water Compound, or *Gereon*'s Tincture of Gentian, made with *Sena*: Beſides theſe, digeſtive Remedies and Deobſtruents which reſtore the Ferments of the *Viſcera* and Blood, are frequently to be uſed: Wherefore fix'd Salts Tartar, Wormwood, Succory, Tamarisk, *&c.* with the acid Spirits, Elixirs, and Tincture of Minerals, as *Mynſicht's Elixir Vitrioli*, and ſometimes preparations of Steel do well: To the Region of the Stomach apply a Plaiſter of Gum, Tacamahaca, Labdanum, Balſam of Peru, Oil of Wormwood and Maſtich, or Mint; or make a Fomentation upon the Belly, and Stomach, with the Leaves of *Roman* Wormwood, Centaury, Southernwood and Agrimony boil'd in White-wine, with Gentian Roots, and give frequently *Elixir Proprietatis* 6 or 8 Drops, in 4 or 5 Spoonfuls of Magiſtral Water of Earthworms.

In a *Quartan Fever or Ague*, the time for the return of the Fit is longer than in the reſt, it being extended to the fourth Day inclusively, and is uſed to be of longer continuance, and more difficultly cured; for this Diſeaſe is protracted for many Months, and often Years, and ſeldom or ſcarce at all yields to Medicines. The Fit for the moſt part begins with a Cold and a Shaking, which are followed with a pretty troublesome Heat, but more remiſs than in a Tertian; Sweat for the moſt part concludes the Acceſs. If the Diſeaſe remains long it brings the *Scurvy*, or Hypochondriack Melancholy, or ſeldom fails to involve whoever hath had it in an ill Habit of Body all their Lives after. The reaſon why this Diſeaſe is of ſo difficult a Cure, and ſo obſtinate, is from the viſcous Conſtitution of the Blood, and the Lentor therein, which is not eaſily removed; for there being in it a ſcarcity and defect of Spirits, from the depravity and vitious Diſpoſition of it, there is need that the whole Maſs be Volatilized, and that it ſpiritualiſes, as it were anew. Wherefore in this caſe evacuatives do not the leaſt good, nay by impoveriſhing the Blood, with Oil remedying it, they muſt neceſſarily impair the Strength.

The Remedies then which only give relief in this caſe are ſuch as ſtop the Fit of the Fever; the chief or principal of which is the Bark, taken in ſubſtance from 1 Ounce, to 1 Ounce and a half, betwixt one Fit and the other, which is about a Dram every third Hour in any convenient Vehicle, or made into a Bole Electuary, *&c.* In the firſt place then it may be obſerved that this Medicine inwardly taken, acts firſt on the Coats of the Stomach and Bowels, and then on the Maſs of Fluids, as it is by degrees protruded through the Lacteals; for till its vertue be communicated to the Blood, its antipyretick force is not at all Exerted, wherefore the Fit next enſuing is not always prevented, but the ſecond or third after its being taken.

As to the ſenſible Qualities with which this Bark is endowed, it is manifeſt that it excels in Bitterneſs, with a certain Stipticity, that by the taſte it is diſcovered to carry in a manner the Reliſh as is uſually found in moſt, or rather Abſtinence, cooling Drinks, evacuation of the Excrements by Clyſters, but above the reſt, Sleep and Eaſe do moſt good, which if wanting they muſt ſeaſonably be procured by *Opiates* and *Anodynes*.

A *Putrid Fever* is when the oily or ſulphurous part of the Blood being too much Heated, grows turgid above meaſure, and is brought as it were to a Flame, and therefore its likeneſs to humid things putrefying, which contract a Fervour, is call'd a *Putrid Fever*. The Liquor of the Blood being thus rarefied, ſtretch the Veſſels, vellicates the Brain, and nervous Parts, raiſes Cramps and Pains in them, very much conſume the vital Spiritss by its Effervelcency, deſtroys the Ferments of the *Viſcera*, hinders the Functions of the Stomach, and Inteſtines, depraves the nutritive Juice ſent into the *Genus Nervoſum*; nay and perverts in a manner the whole Oeconomy of Nature.

The *Procatarctick Cauſes* which diſpoſe to this Diſeaſe are a hot, moiſt, Temperament, an athletick habit of Body, Youth, the Spring or Summer Seaſon, a plenteous and rich Feeding, hard Drinking, a ſedentary Life, a Body Cacochymical and full of ill Juices. The *Evident Cauſes* which draw the lateſt diſpoſition of this Fever into act, are of the kind as thoſe which bring an *Ephe-*

mera, and a *Synochus Simplex*; eſpecially *Perſpiration* impeded, and *Surfeiting*; becauſe in the firſt the *Effluvia*, being reſtrained, the Maſs of Blood increaſing in Bulk grows Turgid; and by ſurfeiting both an immoderate Fermentation is cauſed in the Blood, and alſo a Nitro-ſulphureous Matter, is conveyed as fuel into the inflam'd Blood. In this *Fever* four *Stadia* are to be obſerved, by which as by ſo many Stages its courſe is perform'd; and they are the *Beginning*, the *Encreaſe*, the *Height*, and the *declining State*, theſe paſs over in ſome ſooner, ſlower, and in a longer time. The *Beginning* ought to be computed from the time that the Blood begins to grow Hot, the *encreaſe* from the Maſs being loaded with aduſt Particles, that the Fermentation riſes: The *height* of the Diſeaſe is to be accounted from the fulneſs of the Matter, when it comes to a *Criſis*: The *declining State* follows after the *Criſis*, when the Inflammation grows weak.

When therefore any one is ſeized with a *Putrid Fever*, for the moſt part a cold Stiffneſs, or a ſhivering accompanies the firſt Invaſion, which is followed by a heat that is unequal, and not as yet intenſe. The increaſe of this Diſeaſe is computed from the time that the burning Fever has got Poſſeſſion of the whole Maſs of Blood; therefore the *height* of a *Putrid Fever* is that time that the Diſeaſe in which Nature attempts the expulſion of the aduſt Matter, remaining after the deflagration of the Blood. A *Criſis* in a continual Fever is in a manner the ſame as the Fit of Intermittents; for as in theſe when the Maſs of Blood is ſaturated to a fulneſs, there happens a flowing, ſecretion and expulſion of the Matter; therefore as to what ſome ſay, that the *Criſis* depends altogether on the influence of the Moon, *&c.* It is falſe; becauſe Evacuations are determined only by the Turgeſcency of the aduſt Matter, whoſe Particles if they can eaſily be ſeparated from the Blood, and the Pores of the Skin are but open enough, being involved in the *Serum*, Alexipharmicks, ſuch as the Root of Gentian, Serpentary, Contrayerva, *&c.* for things which are actually bitter are mighty powerful in ſuppreſſing the force of the preternatural Ferments: Nay Cinquefoil, Agrimony, Camomil, and Centaury, were formerly of famous uſe for curing Quartan Agues.

A *Continual Fever* is that whereof the acceſs is prolong'd to many Days without any Ceſſation, it has its times of *Remiſſion* and Exacerbation, but none of *Intermiſſion*, the burning ſometimes is more *Remiſs*, ſometimes more intenſe, but the Diſeaſed is ſtill in a Fever, till the Diſeaſe be wholly ſolv'd by a *Criſis*, or an inſenſible Recovery. Now there are three degrees or manners of Effervescency, by which the Species or kinds of continual Fevers are determined: From the ſubtle Portion of the boiling Blood, or from the ebullition of the Spirits ariſes the *Ephemera*, alſo the *Synochus* of one or many Days. From the ſulphureous or oily part of the Blood too much heated and kindled is raiſed the *Putrid Fever*; Thirdly, on a venemous *Miaſm* infecting the Blood, and congealing its Liquor, Malignant Fevers depend; in each of theſe from the Depravation, or rather corruption of the nutritive Juice, freſh heap'd together in the Blood various Paroxyſms, inequalities and critical Notions ariſe.

An *Ephemera Fever*, and a ſimple *Synochus* ſeldom begin without evident Cauſe; beſides the things aforementioned, immoderate Labour, Watchings, a ſudden Paſſion of the Mind, a conſtriction of the Pores Surfeiting, a Bubo or Wound, in Child bearing an increaſe of Milk: The *Procatarctick* Cauſes which diſpoſe then to it, are hot temper of Body, an Athletick Habit, Sedentary Life, and diſuſe of Exerciſe. Concerning the Solution or *Criſis* of an *Ephemera*, and of a *Synochus* not Putrid, there are 3 things chiefly requiſite, *viz.* A removal of the evident Cauſe. Secondly, a dividing or diſſipation of the depraved or excrementitious Matter from the Maſs of Blood. Thirdly, An appeaſing or quieting the Spirits and their reſtitution to a natural and even State.

The evident is eaſily removed; becauſe no perſon in a Fever upon drinking Wine continues ſtill to drink it; when a perſon grows hotter than uſual by uſe of a Bath or of the Sun, it is troubleſome to him to continue in it longer. Secondly, As to the excrementitious Matter that ought to be pa

parated from the Blood, this is either from without, as by Surfeiting, Drinking, *&c.* when the Blood is infected with hot Effluvia's or Corpuſcles; or elſe inwardly, as when upon the deflagration of the Blood, its Liquor is ſtuffed with aduſt Particles; both theſe Matters muſt be ſeparated, and ſent out from the Blood by Sweat, inſenſible tranſpiration before the Fever is appeas'd. The evident cauſe being removed, together with the offending or peccant Matter, the Blood is to be allay'd by degrees, to which chiefly conduce Bleeding, a very thin Diet, they are ſent forth by Sweat; and this is the beſt way of a *Criſis*, which if it ſucceeds well, it often at once puts a perfect end to the Diſeaſe, without fear of Relapſe.

As to the Event, whether the *Criſis* will be good or no, certain foreknowleges are taken from the ſtrength of the Patient, the Pulſe, Urine, other ſigns to the concourſe of Symptoms: That is if the Pulſe be ſtrong and even, the Urine be of a middle Conſiſtency, with a ſeparation of Contents, if the Diſeaſe proceeds without violent Vomiting, Watchings, a Frenzy, convulſive Motions, and a ſuſpicion of Malignity, there be a good *Criſis* expected; but if the contrary to theſe happen, there is no good to be hoped for. When the Diſeaſe is come to the height, either the thing is brought to a ſtreſs at one Conflict, and thenceforward there is a manifeſt Tendency to health with Declination, or to Death. Or there are frequent ſtrugles betwixt Nature and the Diſeaſe, and critical Motions are often attempted: By the word Declination or Deſenſion I underſtand the Condition of the Diſeaſed, and the Diſeaſe which follows the weight of it, whether it tends to a Recovery, or to Death; whether the Fever or Life it ſelf declines.

The moſt obſervable Symptoms and Signs in a *Putrid Fever*, are firſt the heat which is perceived in the whole Body. Secondly, A ſpontaneous Laſſitude. Thirdly, The great trouble of the *Præcordia*. Fourthly, The almoſt unextinguiſhable Thirſt. Fifthly, The burning and roughneſs of the Tongue and Throat, with the growing of a certain white, yellow or black Fur upon it. Sixthly, Sometimes it happens that the Tongue, Palate, Gums, nay the Cavity of the whole Mouth and Throat are cover'd with a *viſcous Matter*. Seventhly, A Head-ach is raiſed in Fevers, by reaſon of the *Meninges* of the Brain being twitch'd by Vapours, and a ſharp inflamed Blood. Eighthly, Watchings, Delirium and Frenzy ſometimes ariſe from the Blood, making an Effort, and ſo raiſing diſorderly Motions in the Brain. Ninthly, Convulſive Motions happen from various Cauſes. Tenthly, Swooning is procured many ways in Fevers. Eleventhly, A *Cardialgia* happens when the Stomach, eſpecially its Orifices are beſet with a ſharp, bitteriſh, or elſe an acid corroſive Humour. Twelfthly, Nauſeouſneſs, loſs of Appetite, Vomiting, *&c.* are the immediate products of the Fevers. Thirteenthly, Nor is a Looſeneſs a leſs frequent Symptom, which ſometimes happens in the beginning of the Diſeaſe. Fourteenthly, The *Bloody-Flux* is an affect ſo frequent in continual *Fevers*, that in ſome years it becomes *Epidemical*. The inſpection of Urines has more of certainty than in any other Diſeaſes, and is of very great Uſe; for hence the *Stadia* of the ſick Perſon, and the Diſeaſe are excellently well known, and the Phyſical intentions concerning things to be done are hence beſt directed. As to the *Prognoſticks* to be taken from Urine, we obſerve, that ſomewhat a remiſs colour of the Urine, a moderate Conſiſtency, a few Contents ſubſcribing or gathering in clouds portend good; on the contrary, an intenſe redneſs, thick Conſiſtency and groſs Contents which ſubſide not to the bottom; denote a great Effervеſcency.

Of the ſigns and cure of the Putrid *Synochus* or continual Fever; this is divided into a Symptomatick, and an eſſential one; that is ſaid to be Symptomatick, which derives its Origine from ſome Affect or Diſeaſe firſt raiſed in the Body; ſo that the Fever is only the Symptom coming upon the other, as a Quinſey, Pleuriſie, Wound, Ulcer, or the like, among Symptomatical Fevers, they place that which is call'd *Febris Lenta*, thoſe that are troubled with this grow hotter than they ought, eſpecially after Meats, or any Motion or Exerciſe, the Urine for the moſt part is Ruddy, the Spirits are Weak, and the ſtrength Digeſted; but the Fever which deſerves moſt

called

called Symptomatical, is that which is raiſed in Phthyſical Perſons from an Ulcer or Conſumption of the Lungs.

The eſſential *Putrid Synochus* is wont to be divided into the Putrid as above deſcribed, into the *Cauſus* or moſt ſharp burning Fever, and into the *Quotidian*, *Tertian* and *Quartan*. A *Cauſus* or *Burning Fever* is that which performs its courſe with a great burning, an intollerable Thirſt, and other Symptoms, ſhewing a mighty Inflammation of the Blood: Its formal Nature wherein it's different from the reſt conſiſts in this, that the Temper of the Blood is hotter, therefore when it rages it is kindled in greater Plenty, its Motion is acute, and ſoon comes to the Height, it is attended with more horrible Symptoms than others, it has a difficult *Criſis*, and its event is very dangerous.

Concerning the Cure of *Putrid Fevers* there are four general Intentions, and as to the particular Remedies with which thoſe Intentions are anſwered, there are various Preſcripts and Forms of Medicines ever in uſe, which it will not be needful for me to repent in this place, but only ſet down briefly ſome of the chief Indications and Phyſical Cautions which ought to be obſerved in the courſe of this Fever, according to the various Seaſons and Symptoms of it. About the firſt Invaſion of this Diſeaſe, you muſt endeavour that the Fever be forthwith ſuppreſs'd, and that the Inflammation of the over heated Sulphur be ſtop'd, to which breathing of a Vein chiefly conduces; moreover let a thin Diet be ordered; let the *Viſcera* and firſt Paſſages be freed from the load of excrementitious Matter; wherefore a Clyſter will be of neceſſary uſe; ſometimes alſo Vomits and gentle Purges, which being now and then given ſeaſonably will preſently extinguiſh the Fever. When the *Fever* is in its *increaſe*, if the Blood boils too much and extends the Veſſels, with a vehement Pulſe, if Watching, Frenzy or Head-ach violently preſs; Bleed a ſecond time, and let as free a Tranſpiration, as may be, be procured. Clyſters are given with ſafety, and indeed with good Effect, but let Catharticks and Diureticks which too much exagitate the Blood be avoided: Alſo Julips and Decoctions which cool the Bowels, qualifie the Blood, and refreſh t Spirits, are frequently to be given, with cids of Vegetables or Utinerals, which r ſtrain the Motion of the Blood, and quen Thirſt: In caſe the Head is violently affe ed, apply *Epithemes* of the warm Fleſh, inward Parts of Animals to the Feet.

When the Fever is at the height, let t Motion of Nature be diligently minde whether it be about to make a *Criſis* or no wherefore nothing is to be done or atte pted raſhly by a Phyſician, breathing Vein, or ſtrong purging are wholly forbi den; but afterwards upon the abating the Symptoms in caſe the Motion of Natu be Sluggiſh, a Sweat or gentle Purge m be procured; but if all things be crude a in a Perturbation; the Urine ſtill troubl without Separation, if the ſtrength be Fai the Pulſe Weak, if no *Criſis* or only a fru leſs one has preceded, any Evacuation m not be attempted, mean while let t ſtrength be refreſh'd with temperate Cor als, let the immoderate effervеſcence ſtop'd, and its due Fermentation be ma tained, which is excellently perform'd Coral, Pearl, and thoſe kinds of Powd which are diſſolved by the Ferments of *Viſcera*: In the interim let all Obſtacles removed, eſpecially the firſt Paſſages cle ſed by Clyſters. In the declining State Fever; when after a perfect *Criſis*, Nat has gotten the upper hand of the Diſe things are in Safety; nor is there much for a Phyſician to do: It only remains propoſe an exact form of Diet, that the eaſed may ſoon recover their Strength, wi out fear of a Relapſe.

Beſides the continual Fever, ſuch as ſcribed before, and which ariſes by reaſo ſome principle in the Blood exalted too mu and diſproportionate with the Reſt; wh is another Species of it, which is raiſed reaſon of the Blood being tainted with ſo venenous *Miaſm*, and thereupon ready incur various Coagulations and Corru ons, in which not only the Spirit and phur as in a Putrid Fever, making an e bitant Effort, and force the Blood to immoderately, but withal, the mixtur the Blood is forthwith diſſolv'd, and its quour runs into Parts; under this H we comprehend Malignant and Peſtilen

Fe

Fevers, the Plague, Small-Pox and Meaſles concerning the two laſt, of which we ſhall only treat. As to the Origine of the *Small-Pox*, they have a Seminary Connate Pirnciple to us proceeding from the impurity of the Blood, conceived in the Womb with the firſt Rudiments of the *Fœtus:* But as to the Affects, they produce preternatural Symptoms, and venemous as the Plague it ſelf, ſo that they conſtitute a certain peculiar ſort of Fevers, which belong to *all Mankind, and only to them; and that but once.* If happily any one lives free from them all his Life, or ſome one falls often into thoſe Affects, theſe are rare, and unuſual Events of Nature; which do not derogate from common Obſervation, but it may paſs for a Truth, that all and only Mankind are obnoxious to the *Meaſles* and *Small-Pox*, and that they are uſually freed of them at once.

The evident Cauſe which ſtirs theſe fermentative Seeds, and oftentimes brings them into Act, is ſaid to be threefold, *viz.* Contagion received from elſewhere, the diſpoſition of the Air, and an immoderate Perturbation of the Blood and Humors: Perſons related ſoon infect each other, alſo thoſe that are fearful and mightily dread this Diſeaſe, fall more readily into it, for by fear the Particles of the *Miaſm* are convey'd from the Surface of the Body inward: At the time that the Contagion is riſe, and the *Small Pox* is Epidemick, all other Diſeaſes in a manner degenerate into this. The *Miaſm* of the *Small-Pox* is as a Ferment, but corruptive, that forces the Blood to ferment, not towards a Perfection but Depravation; for when the venemous Particles of this *Miaſm* light on a capable Subject, they preſently ſtir up Corpuſcles like themſelves, and innate to us, with which being joyn'd they pervade the whole Maſs of Blood, and make it Swell or grow turgid in the Veſſels; the Portions of this Blood being congealed with the Venom, about the 4th Day, ſometimes ſooner, ſometimes later, begin to break forth; for the Coagulation is not cauſed preſently, but after ſome time that the Venom diſplays it ſelf, and by its effervеſcence ferments the Blood: Firſt light Portions of the Blood being defiled, and thoſe but few in Number, are fix'd in the Skin like Fleabites; ſoon after theſe more appear, and thoſe which brake forth firſt by the Acceſs of new Matter, and by the continual Appulſe of the coagulated Blood, grow bigger and are raiſed into a Tumour: Afterward theſe Puſhes which at firſt are Red, being increaſed by degrees, at length turn White, to wit, the extravaſated with the Venom, by reaſon of the Heat and Stagnation, is chang'd into *Pus*. About the ſeventh day after the Eruption, the white Tumours turn to a dry Scab; for the more ſubtle part of the matter being evaporated the reſt grows hard, which at length, the Scarf-Skin being eaten off, and broken falls from the true Skin or *Cutis*.

When the *Miaſm* of the *Small-Pox* is once gotten into the Spirits and Maſs of Blood, it is very ſeldom that it can be deſtroy'd or clear'd off, by Medicines or Bleeding, but the latent diſpoſition will break forth into it; wherefore, firſt it diffuſes it ſelf gently, and inſpires the Maſs of Blood as it were with a Ferment, hence an Ebullion and Efferveſcence are produced in the whole Body, the Veſſels are extended, the *Viſcera* are irritated, the Membranes are twitch'd till the Seed of the Contagion, by fuſing and coagulating the Blood, at length being involved in its congeal'd Portion are thruſt forth. The Eſſence of this Diſeaſe will be better known if I ſet down the Signs and Symptoms, which are obſerved in the whole courſe of it, and give you in order the reaſons of them, and the Cauſes on which they depend: Now theſe are either ſuch as indicate the Diſeaſe preſent, or ſuch as foreſhew the height of it, and its Event.

As to the Diagnoſtick of this Affect whereby it may be known whether any one at firſt falling Sick will have the *Small Pox* or not. There muſt be conſider'd at that time the force of the Contagion, and the concourſe of the Symptoms firſt appearing; for if by reaſon of the malignant Diſpoſition of the Air, this Diſeaſe generally Reigns, no one is then ſeized with a Fever without a ſuſpicion of the *Small-Pox*, eſpecially if the perſon never had it before: But if it be more rare, and there be no fear of Contagion, the Signs and Symptoms following will diſcover it.

First there is an inconstant Fever, coming at Random, sometimes Intense, sometimes more Remiss, observing no form of increase or coming to a Height, so that the Patient is sometimes Hot, and by and by without any Fever at all. Secondly, A Pain in the Head and Loins is so peculiar a sign in this Disease, that it alone in a continual Fever, signifies an imminent *Small-Pox*. Thirdly, A great irksomeness and Restlessness, and sometimes a Swooning infest the Diseased, by reason of the irregular and tumultuous Motion of the Blood. Fourthly, A Vomiting to excess, even when the Stomach is free from an impure Mass of Humours, very often accompanies this Affect: To these may be added; in the Fifth place, the Symptoms which according to the various Dispositions of Bodies, happen after a various manner, as are, a great Sleepiness, frights in Sleep, Deliriums, Tremblings and Convulsions, a Sneezing, Heat, Redness, a sense of pricking in the whole Body, involuntary Weeping, a sparkling and itching of the Eyes, a swelling of the Face, a vehemency of Symptoms from the beginning, that the Disease seems presently, to have reach'd its Height.

As to the Prognostick of this Disease, it is indicated either to be safe; mortal or doubtful by supervenient Signs. First, Things seem to be in safety when this Affect has benign Circumstances; to wit, when it happens in a good Disposition of the Air, and of the Year, at a time when the *Small-Pox* is not Malignant; also there is less danger in Childhood, or Infancy, or in Families where the Disease has not been Mortal: If about the fourth day the Fever and the most pressing Symptoms abate, and then some red Spots begin to appear, if the second day of their appearance a great many more are Conspicuous, which afterwards grow by degres into *Pushes*, and are ripen'd into *Pus* or Matter; if about the Tenth Day after the irruption the white *Pushes* begin to grow Hard, and afterward to fall off by little and little; if after the time of their first breaking forth, the *Small-Pox* are soft, separate from each other, are few and round, possessing only the Skin and the inward Part, we may judge the Patient to be in a good State.

Secondly, The *Phænomena* which demo the case to be suspected and full of dang are these; if there be a Malignant Constitu tion of the Air, that the Disease is becom Pestilent: If Persons well grown in Ye are seized with it, if it chances in a foul a cacochymical Body: If any *Viscera* are i firm, or if the habit of the Body be t gross the *Small-Pox* does not happen wit out great danger of Life: If there be a mig ty Thirst, and a difficulty of Breathin also a Looseness or Dysentery they shew th Perspiration is hindred, and the Malign Humours restagnate toward the inwa Parts; If they break forth slowly they arg a weakness in Nature; if double and co fluent they shew that there is an excess Quantity, and a Confusion, as well as regular Expulsion of that Matter, since it not thrown out at determinate Plans a Pores: *Small Pox* which are hard, signifie stubbornness of the Humours to Flux; black Spots appear, or such as are famil in a purple or pestilential Fever they sh a mighty Malignity and Corruption in Blood; in short, black, livid or green *Sm Pox* threaten ill; because, besides the C gulations of the Blood, they argue its M tifications and Corruptions, as in a ga grene or pestilent Carbuncle: If when *Small-Pox* are come forth they presen wither, and the swelling of the Parts rem it indicates the recess of the Malignant M ter, or of the Blood congealed with Venom and its Restagnation in the inter Parts; whence unless upon raising a *Diaphoresis* it be again driven out, a sud Death for the most part follows.

As to what concerns the Cure since course of this Disease has three *Stadia* like many Stages as it were distinct from e other; the curative Intentions ought also be accommodated to each of these; wh fore the Therapeutick Method concern the *Small-Pox* teaches first what is to done, as long as the Blood boils inward and ferments by the Motion of the ferm tative Matter, and the *Small-Pox* do not appear; which Period for the most pa wont to be ended in four or five D Secondly, What form of Diet and Phy ought to be order'd, from the time of

ruption of the *Small-Pox* to the height of he Diſeaſe, to wit, till the *Puſhes* are come o their height, and being fully ſuppurated egin to wither. Thirdly and Laſtly, hat we ought to obſerve in the Declina- on of the Diſeaſe, till the *Small-Pox* being y'd fall off.

As to the firſt, the Intention muſt be; at we remove all impediments of Nature, hereby the Blood being defiled with the rment of the *Small-Pox*, and apt to be coa- ulated, may retain ſtill its even Motion in- e Heart and Veſſels, without Stagnation, d that fermenting it may expel forth the ortions coagulated with the Venom; mean hile a caution muſt be had, that the work Fermentation or Effervеſcence, be neither y ways check'd, nor too much irritated; r by this the Maſs of Blood is forced in coagulated Portions more than it ought, d by the other it is reſtrain'd too much in lotion, nor are the venemous Particles ſent way forth with the congeal'd Blood. Na- re is wont to be hindred from the Secre- on and Expulſion, by a too great heap of crements in the *Viſcera*, by an over abound- g of Blood in the Veſſels; wherefore pre- ntly, at the firſt Invaſion of the Diſeaſe, e muſt endeavour that an Evacuation by omit or Siege if need be ſeaſonably pro- ured: We muſt uſe only mild and gentle edicines, that is which do not irritate or ouble the Tumour; wherefore at this time metimes, Emeticks, Purges or Clyſters, eſe one while, another while thoſe bear lace; opening a Vein alſo, if there be a enitude is uſed with good Succeſs. Du- ng the effervеſcence of the Blood, let a thin d moderate cooling Diet be order'd, to it, of Oat and Barley Meals, Marigold, ges, and common Poſſet-drinks, with oſe made of Harts-horn and Scorzonera oots: Or Boil Cochinel, and a little *apis Prunelle* in Water, with Roots of Con- ayerva, Galingal, *Anula Campana*, toge- er with the Leaves of Elm, Scabious, or arigold Flowers, ſweeten moderately, and ve this as a Drink to be uſed during the hole Diſtemper; if occaſion be a little ck and Saffron may be added to this Apo- n, which will temper the Blood, and ep the Body in a ſtate of Perſpiration.

When the *Small-Pox* begin to appear, there are three things which ought to be conſtantly order'd all Sick Perſons; to wit, that a mild and gentle *Diaphoreſis* be always continued in the Maſs of Blood; alſo that the Throat and Eyes be preſerved from the too great Eruption, that the Blood gently boiling may puſh forth the Diſeaſe: For this purpoſe make a Decoction of Figs, Marigold and Columbine Flowers, with Shavings of Harts-horn, Ivory and Scorzonera Root, to which upon occaſion may be added a little Saffron or Cochinel; alſo we give moderate Cordials frequently in a Day, with *Gaſcoign*'s Powder, Crab's Claws Simple, Crabs-eyes, Pearl, Coral, *&c.* let the hot ſtrong ſpirituous Cordials be avoided, as alſo bleeding or any Evacuation in the Irruption, leſt the Motion of Nature be inverted in in its own Courſe. For a guard to the Throat, apply a Wollen or Flannel Cloth, and if there be occaſion dip it in a Decoction of Salt of Nitre or Prunelle, or uſe Gargariſms of Plantane Water, Pomgranate Peell, Syrup of Mulberries and *Lapis Prunelle*, which may repel the *Small-Pox* in thoſe Parts. We fortifie the Eyes, with *Epithemes* of Roſe Water, Breaſt-Milk and Saffron, or a little Sugar of Lead diſſolv'd in Plantane Water, with ſome Sugarcandy. Againſt the more violent Symptoms, as Watchings, Frenzy, Vomitings, Looſneſs, *&c.* There is required very great Skill and Experience, as well as Care and Circumſpection, both in the Phyſician and Attendants.

When the Diſeaſe is in its *Declination*, and the *Small-Pox* begin to wither away, and grow Hard, the caſe for the moſt part is out of danger, nor has a Phyſician much to do: Let the Patient though growing very hungry, ſtill be content with a thin Diet without Fleſh Meats: If the *Pox* are ſlow in falling off we are us'd to haſten their Fall, with Liniments and *Epithemes*, as Oil of ſweet Almonds, white Lillies, *Sperma Ceti*, Camphore, with Bean Flower Water, *Solomons* Seal, white Lillies, Snails, *&c.* by which means they are prevented from pitting much. After the *Small-Pox* is fallen off from the Face, Purge the Patient gently two or three times before he goes abroad, and afterward

he may be admitted to a freer Diet as u-ſual.

The *Meaſles* are ſo allied to the *Small-Pox* that amongſt moſt Authors, they have not deſerved to be treated of ſeparately; but the effects of both are delivered after the like manner and method together. The Eſſence and Cure differ no otherways but as to more or leſs, or at leaſtwiſe accidentally; becauſe in the *Meaſles* the *Puſhes* are not ſo much raiſed in Height, nor are they ſuppurated. Wherefore the Diſeaſe ends ſooner and with leſs danger: This is wont moſt frequently to reign amongſt Children, but ſeldom ſeiſes ſuch as are grown in Years, or old People: Alſo thoſe who have had the *Small Pox* before, are not afterwards ſo ſubject to the *Meaſles*, but in moſt they are allied Indiſpoſitions; to wit, the Taint contracted from the Womb diſpoſes Men alone, all Mankind, and that but once to the *Meaſles*: A Malignant Conſtitution of the Air, and ſometimes Surfeiting, but moſt commonly Contagion, are wont to draw into act the latent Diſpoſition. Here are marks of Malignity, and the Diſeaſe often becomes Epidemical with a Mortality and Contagion.

To give you the thing in ſhort, it ſeem that the *Meaſles* are a certain light effloreſcence of an extraneous Ferment, contracted from the Womb; whereby ſome Particles being ſtirred to Motion, cauſe the Blood gently and to be a little Coagulated; wherefore the Pimples thence brought forth are blown off by Evaporation, without a breaking of the Skin. But the *Small Pox* are more full and ſtrong Agitation of the ſame Ferment, and in all its Particles, which cauſing a greater Ebullition and Coagulation of the blood, produces a great many more *Puſhes*, and thoſe larger in Size & Bulk, and not diſſolveable without Suppuration. When the *Small Pox* precede, there follows not only an immunity afterward from the ſame Diſtemper; but for the moſt part from the *Meaſles* alſo: Theſe laſt, becauſe they conſume only a few Particles of the Ferment leave ſtill a Diſpoſition to the *Small Pox*: Wherefore old Perſons or ſuch as are grown in Years, are not ſo readily infected with the *Meaſles*, becauſe having been before infected with the *Small Pox* they are freed from the Contagion; or their Spirits being Robuſt, eaſily reſiſt the light *Miaſm* of this Affection.

Of Fevers Acute or Continual, and Intermittent; with an Account of the Cortex *and other Specifick From Dr.* Paxton, Michael Torris, *&c.*

AS there are but two ways of diſcovering the Condition or Alterations of the Blood; I ſhall here ſhew the Diſeaſes that are ſeated therein; which may be diſtinguiſhed into two ſorts, *viz. Acute* and *Chronick*: By the firſt of which I underſtand, ſuch as are ſudden and violent, by the ſecond, ſuch as are *Slow and Languid*: The firſt are uſually but of ſhort Continuance, the other more Tedious; the firſt may be again divided into Continual and Intermittent.

An acute Diſeaſe in the Blood, is ſo ſudden and violent change in it, immediately perceived by ſome alteration in its functions, which are uſually accompanyed with ſome changes in the Separation, and is apprehend, what is commonly and in general ſignified by the word *Fever*: true this is often diſcern'd by Heat, quick Pulſe, or both: However, the *Fever* in the modern Senſe of the word not ſtrictly confin'd to either. A *Chr* Diſeaſe in the Blood is only a ſlow ch

there, that gradually riſes from almoſt unperceived beginnings, and is diſcover'd by the ſame Methods; and is what ordinarily I ſuppoſe call'd another habit of Body, or ſcorbutical State, or by ſome other indefinite Term.

For in either of theſe States, if the Blood makes any unnatural Separation, by which means ſome formidable Symptom is produc'd, it matters not whether to the advantage or not of the Patient; it has been honour'd with a particular Name, and then of Courſe treated as an intire Diſeaſe, as I ſhall ſhew hereafter. Whoſoever will be pleaſed without prejudice to conſider the word *Fever*, in its general ordinary and modern Uſe, that is, in its full latitude, will find that there can be nothing more intended by it, if indeed any thing certain and real, than ſome ſudden and unknown change in the Blood, by which the diſeaſed is Affected, either with Sickneſs, Pain, Unealineſs, loſs of Strength, and ſuch like: And which can be diſcovered to us but by ſome of the above recited ways. It is true the original and genuine import of the Word, ſeems to carry a more determinate ſenſe, for if the Engliſh word *Fever*, is taken to anſwer to the Latin *Febris*, and the Greek Πυρετὸς then it ſeems properly to imply Heat, and then in that conſiſts its eſſence. But if we obſerve the Writings of ſome Moderns, we ſhall find they will not admit of Heat, but a quick Pulſe to be the pathognomonick Sign, and ſome again neither. But my purpoſe not being to examine Authorities, but to follow Truth, not to concern my ſelf about the uncertain uſe of Words, but to apply my ſelf to things, it is certain the Word Fever is ſometimes uſed where there is no unuſual Heat, and it is as certain, it is uſed where there is no uncommon quick Pulſe. Neither is it always uſed when there is the one or the other. If then it be asked in what it conſiſts, or how it is to be known? It may be anſwered, in neither ſeparately nor in any one ſingle Symptom, but in a Blunder or Collection of ſeveral, that ariſing ſuddenly and co-exiſting are expreſſed by that ſingle Word, and ſo are conſider'd, as making one Diſeaſe. But whenſoever the Blood appears under any hidden Diſorder, and the Body thereby Diſeas'd, that Indiſpoſition is ordinarily call'd a Fever.

The different deſcription of this Diſeaſe, the divers and even oppoſite Methods recommended for its Cure, abundantly ſhew the uncertainty of its Nature, there being almoſt as many Opinions as Authors; for the Term *Fever* ſeems to be as looſly applied in all ſudden and violent alterations in the Blood, as the word *Scurvy* in ſlow ones. As to our ſecond Diviſion into continual Intermittent, the words ſo exactly anſwering the Alterations, they need no Explanation.

But before I more particularly deſcend to treat of ſuch things as are uſually obſerv'd to be the Effects of ſudden and violent Changes in our Blood, it may not be altogether improper to touch at Cauſes, by reaſon it hath been a prevailing Opinion among a great many Learned Men, That neither the Nature of Diſeaſes are to be diſcover'd, nor Methods ſafely inſtituted for their Cure, unleſs their Cauſes can firſt be Traced. That there is a Pleaſure in Knowledge I no way doubt; but to pretend to a knowledge in things that are not capable of being known, is to betray our Ignorance; to ſearch after Cauſes, is to purſue our Shadows, which we can neither overtake nor uſe; for we are neither capable of perceiving from whence they come, how they are receiv'd, or in what time or part they enter: Theſe poiſonous and deadly Agents (that in all probability ſwim in the Air, becauſe ſuch Diſeaſes are propagated by Contagion) and produce Peſtilential and Malignant Diſeaſes, (at periodical Times in ſome Countries) are not diſtinguiſh'd from the Air they move in; neither is the Venom felt in our Veins, nor their Poiſon diſcern'd in its Operation.

Beſides, ſuppoſing our Faculties were ſo elegantly Nice, that we are able to diſtinguiſh thoſe ſubtle Meſſengers of Diſeaſes; I do not ſee what Advantage could be obtain'd by that Knowledge; becauſe no ſooner are theſe fatal Miniſters receiv'd into our Blood, but they are immediately diffus'd through the whole Maſs, and of neceſſity ſo blended and mingled with the other *Parts*, that they are neither to be diſtinguiſh'd nor ſeparated: For now being whirl'd about in Circulation, and paſſing

through

through all the ſmall and Meandring Veſſels, they undergo a multitude of Viciſſitudes, and ſo really become a part of the Blood, until they are again ſeparated from it, which is not the work of Humane Skill, but of Nature; for it is plain, we are not with all our Art able to ſeparate any one Subſtance from the Blood, that is actually mingled with it: And if this cannot be effected in ſuch things as we do know, how vain is it to expect it in things we do not know? To diſcover the Truth of this, we need but examine thoſe Subſtances that are diſcharged from us, which bear no manner of reſemblance to what we Eat and Drink; nay although the Blood is made out of diſſimilar Subſtances, yet ſo long as it runs in our Veins, our Senſes diſcover no difference in the Parts of this ſcarlet Liquour. For whatſoever enters our Veins to be mix'd with, and converted into Blood, being firſt prepar'd by our Organs, by which it is ſo divided and alter'd, that the former Qualities are deſtroy'd, and new ones ariſe; and by this means although the Subſtances we Eat and Drink, often appear in their Qualities ſo very unlike, yet ſuch are promiſcuouſly converted into the ſame crimſon Gore; the new Qualities by which they become Blood, being imparted to them by the ſeveral Alterations that are made by the Organs thro' which they paſs: It is from this reaſon, the Blood bears no reſemblance to the Subſtances out of which it is made; becauſe the former Qualities of ſuch Subſtances being deſtroy'd by our Organs, the new ones that ſucceed bear a likeneſs to each other, as being given by the ſame Inſtruments. It is from the ſame reaſon, that thoſe Qualities that Men uſually ſurvey in emitted Blood, *viz. Colour and Conſiſtency*, are not obſerv'd to be, according to what Men Eat and Drink, but according to the Nature of the Organs by which it is prepar'd; the Blood of the voluptuous Beau not being to be diſtinguiſh'd from that of the wretched Peaſant, ſuppoſing their Health to be the ſame.

It is true, there are ſeveral Subſtances that notwithſtanding they are prepar'd by our Organs, and converted into Blood, yet retain ſuch poiſonous Powers, as to be deſtructive to our Beings: But theſe direful Effects do not ſeem to proceed from any ſenſible Qualities of ſuch Subſtances; but from ſome peculiar Figure of the minute Parts, which Figure not being alter'd by our Organs (for our Organs only divide and reduce Subſtances into their minute Parts, by which the ſenſible Qualities, as depending on their Textures are alter'd, but the Parts themſelves may retain their Figures) the noxious Powers flowing from ſuch Shapes may remain: And yet theſe thus unalter'd Particles, receiving from our Organs new Poſitions, new Determinations, new Habitudes and Relations, contribute to the producing ſuch Qualities as intitle a Subſtance to be call'd Blood; for that the Qualities that appear in Blood, proceed from the poſitions and relations of the Parts, ſeems evident, in that they may be ſo eaſily alter'd by Phlebotomy; for but ſtreighten or enlarge an Orifice, or but change the manner of the Stream, and you alter the Colour and Conſiſtency of the Blood that flows.

Furthermore, The Blood when Diſeas'd is ſo depraved, as to remain unable to perform the regular Offices, by which the whole Body ſuffers: To remove the Diſeaſe, the Blood muſt be ſo reſtor'd, that the Functions may be Executed. To do this ſuch Subſtances muſt be adminiſtred, that are known to have a Power to reſtore the Blood to ſuch a State; and to judge what Medicines are fit for this Uſe, we muſt inform our ſelves of the State of the Blood, by ſuch ways as we are capable of knowing; which are only by the Motions and Separations, (as hath been already demonſtrated) neither of which (as is manifeſt from what hath been obſerv'd) can lead us into any knowledge of Cauſes; or if they did, ſuch a Knowledge cou'd give us little aſſiſtance in the Cure of Diſeaſes, although it might perhaps ſome in avoiding them. Theſe things being ſo, methinks we trifle away time to little purpoſe, in the purſuit of Cauſes we can never know; and if we did know, could be of any uſe to what we intend them.

But to return, ſudden Changes or Commotions in the Blood, which I ſhall now call Fevers, may be conſider'd under two Heads. In the one of which the Motions may be obſerv'd violent, and the Separations leſſen'd. In the other the Motions appear alter'd, the Pulſe being perhaps quite

, but not ſtronger, and the Separation ra-
er encreas'd; or although perhaps leſſen'd
one part, yet encreas'd in another. In
e firſt, the Craſis or Mixture of the Blood
ems too ſtrict and cloſe; the Parts being
pt together by the violence and impetu-
ty of the Circulation. In the other they
too looſe, being too apt to part and di-
de, as not being mov'd forward faſt e-
ugh. In the firſt the Blood is by the too
olent and ſtrong Pulſations of the Heart,
o rapidly whirl'd about the Body; by
hich means the Parts are ſo confounded,
mbled, and ſo entirely mingled, that they
nnot break or part from each other, and
Veſſels become turgid and full, ſo
t there is neither time nor ſpace for lei-
ely Separations. And the Blood thus fu-
uſly drove about in Circulation, the
rts heat, expand, and ſometimes extra-
ate or burſt out of their proper Veſſels;
being by ſome means ſtop'd or hindred,
its crouding through the ſmall, narrow
d *meandring* Paſſages, or by the Formati-
or Situation of ſome Parts, or by ſome
er unknown Cauſe, not ſo readily paſ-
g in ſome Places, as in others, it creates
d raiſes Pains, Inflammations, Soreneſs,
d ſometimes Tumours; any of which
en obſerv'd formidable or dangerous, be-
me then honour'd with particular Names,
d are treated as entire and particular Diſ-
es; and ſuch Diſeaſes, which is very re-
kable, are for the moſt part denomina-
from the Part then affected, or from the
nner of affecting; hence the Diſeaſes,
uritis, *Peripneumonia*, *Rheumatiſmus*, &c.
d ſometimes ſuch are in the general term'd
y Inflammations; or if it burſt out of
Veſſels in Bleeding, Hæmorrhages. In
ſecond ſort the Pulſe is rather quick and
k than ſtrong, the Veſſels not Turgid,
which it ſeems as if the Heart did not re-
ve or throw out the Blood in proportio-
le Quantity, ſo that the circulatory Mo-
n appears but ſlow, that always being as
pulſations of the Heart are. The Cra-
of the Blood ſeems ſomewhat looſe, there
g time and ſpace for its Parts to break
divide, ſome of which ſtopping will
me Obſtacles to it, in its progreſſive
ion; hence therefore it muſt circulate
qually, becauſe being contain'd in that
Motion by an impulſe from the conſiſtent Parts, it muſt run in greateſt quantity where it meets with leaſt Reſiſtence; hence the Secretory Veſſels or Parts fitted for Separations, being unequally ſupply'd, muſt ſeparate unequally; ſo that if Separations are diminiſh'd in one Part, they will be uſually enlarg'd in another. Thus may we often obſerve Sweats perhaps by Parts, as only upon the Head, Face or upper Parts, and ſometimes profuſive ones over the whole Body, Vomitings, Looſneſſes, ſometimes although more rarely, diſproportionate Quantities of Urine, which perhaps might be more frequent, were Men not obliged by Weakneſs or Command to a Bed, and ſometimes Salivation: In ſome the very conſtituent Parts, ſo break and divide as to ſtagnate near the Surface, and to create various Diſcolourations and Spots, but the Circulation not being forcible enough, do not riſe into Tumours, or create Inflammations; and ſometimes the thinner Parts will be ſpew'd ſlowly out of ſome of the Capillaries.

The word *Fever* is promiſcuouſly us'd, as is moſt manifeſt from the Symptoms to denote two different States of Blood. In the one of which the Blood moves too rapidly in Circulation, by which means the Parts are ſo confounded, that the Separations are for the moſt part leſſen'd.

In the other the Circulation is ſo Languid, that the Parts become apt to divide and part from each other, by which means the Separations encreaſe.

In the firſt Caſe, the return of the Separations is the Cure of the Diſeaſe; and ſo are call'd Critical. In the laſt Separations give no advantage, and ſo are term'd Symptomatical.

I would not be thought ſo vain as if I imagin'd, that all ſudden Commotions of the Blood, which are compris'd under the Term Fever, could be always obſerv'd nicely to quadrate with what I have here but in the general hinted; for although their appearances may be conſider'd under the Heads I have plac'd them, yet it muſt be no wonder if they do not always continue in their whole courſe the ſame; for their beginnings, progreſs, height or declination, will be ſometimes very Differing, both in their

Motions

Motions and Separations. Beſides, the frequent Remiſſions make marvellous Alterations to the Obſerver, by reaſon the variation in the Motions is immediately perceiv'd, but that in the ſeparated Juices cannot; becauſe they may remain ſome time in the Body after they are Secern'd, before they are Excreted. However, it is ſufficient to my Purpoſe, that we are indebted to theſe for all the knowledge we have of ſuch Commotions, there being nothing elſe that can appear to direct us in it.

The Sum then of what I have ſaid is, That Diſeaſes in Humane Bodies are Changes in them; and that all ſuch proceed from the Fluids, that is, the moving Particles; and not the conſiſtent Parts, that is, from ſuch as are United: That if they are Affected, *viz.* the conſiſtent Parts, as ſometimes they are, it is by the means of the Fluids, (excepting where they are injur'd by ſome external Violence.) That in our Bodies may be obſerv'd variety of Fluids, of which two are common, the other proper to particular Parts. Of the common, one is primary, being the ſource from whence all the others, as well common as proper, are ſeparated. That the primary common Fluid is what we call the Blood, which is made up and compounded of very differing and unlike Parts. That this Blood enjoys two Motions; the one of which is natural to it as it is a Fluid, being only the inteſtine Agitation of its minute Parts: The other is its Circulatory, Animal, or progreſſive Motion, which is proper to Life. That by the firſt of theſe it is in its natural and healthful State, diſpoſed to ſeparate and part from its diſagreeable, uſeleſs and unneceſſary Parts; that is, the Homogenous Congregate, and by that thruſt out and ſeparate from the Heterogeneous; but that it is hindred in this Work, by its being impell'd forward in Circulation; however, that it doth ſend out ſuch Parts by the ſecretory Veſſels, as are requiſite to continue it in a State that may be uſeful for the Body. That theſe Veſſels are only paſſive in Separation; for being conſiſtent Parts, they naturally remain, in relation to the Body, in the ſame Place and State. That in Health the Blood is always diſpos'd to let go ſuch Parts, as are neceſſary to form ſuch appropriate Juices as theſe Veſſels are prepar'd to ſeparate and the Blood always circulating, theſe Veſſels will be ſupply'd: So that ſo long as theſe two Motions are Natural, equal and juſt, the Separations will be ſo, and then ſo far as we can diſcover, the Blood is in a ſtate of Health; but when the Natural Concord between theſe two Motions is interrupted, the Blood ſwerves from its natural State, and the Separations become alter'd and vitiated. Then it muſt follow, muſt be by theſe, that the Vices, Faults Diſeaſes of the Blood, can appear to us ways, but by theſe Separations from it, the Motions of it. And as it is only fr theſe we can diſcover ſuch, ſo it is only theſe we can be directed in our Methods Remedy, becauſe, indeed, there is no ther ways whereby to do it. That the count had from the Sick, can give us ſm light into the Nature of ſuch Diſeaſes, cauſe he can only relate what he kno which, indeed, is nothing of the Blo That the ordinary way of treating Sickn under certain Kinds, is uncertain and d gerous, in that the ſame Symptoms do regularly co-exiſt. That it is but frivo to enquire after Cauſes, which, if kno cou'd be no help to the curing Diſeaſes.

I. Having already diſtinguiſhed Diſe or unnatural Changes in the Blood, two Sorts or Kinds; firſt into ſuch as ſudden and violent, and ſo call'd Ac and ſecondly, into ſuch as are ſlow languid, and ſo term'd Chronick. the former being again ſub-divided continual and intermittent; and h briefly treated of the Continued, it re upon me, according to my propoſed thod, to ſpeak ſomething of the Inte tents. In which the Blood does no we are plainly taught by the Symp continue in a ſettled, diſorder'd State ſhifts and changes; ſometimes we ma ſerve it all in a Hurry, which is wh call the Fit, which gradually wears of then it is for a time more quiet, Cal Natural, and then again it falls into order; and thus theſe will interchan return at ſuch certain and periodical

s their returns may eaſily be fore-known, f by ſome irregularities they are not di-turbed or alter'd.

II. I have already intimated, that there s no one known Remedy (nor perhaps, if we rightly conſider the natural State of the Blood, never can be) that will certainly, afely and effectually Cure, ſuppreſs or ex-inguiſh a ſudden Diſorder or Commotion, ctually begun in the Blood. Becauſe ſuch Diſorders being occaſion'd by the Acceſſion f ſome diſagreeable Matter into the Maſs, annot naturally Ceaſe, until that Matter again ſeparated and parted, (which as ath been prov'd, is the proper work of the lood it ſelf;) for notwithſtanding the lood may be diſpoſed to Separation by me-icinal Helps; yet whether ſuch Separations ill be of any Advantage, depends upon e Diſpoſition of the Blood to throw off e peccant Parts: For Diſeaſes, or Diſor-ers in the Blood, are only a ſort of Strife Colliſion between the Parts; in which onflict, if the Parts that are Friendly, Ho-ogeneous, and agreeable to our Natures, revail ſo far, as to expel and drive out the hers, the Diſeaſe ends happily; but if uch as are Enemies to our Nature are too owerful, the Conſequence is Fatal.

Whenſoever therefore the Blood is conti-ually ſupplied with new Matter, to ſup-ort or continue theſe Diſorders; it is ma-ifeſt ſuch are not to be ſuppreſſed, until hat thus occaſions them can be remov'd; ecauſe although ſuch naturally end upon e Expulſion of what occaſion'd them; yet ing by the addition of new Matter Re-w'd, they continually Repeat. But if the lood ſhifts and changes its State, falling ly into Commotions at certain periodical imes, which often appear in very different d ſometimes ſurpriſing Symptoms; which twithſtanding in ſuch a determinate Time adually go off and Vaniſh; and then a-in at ſuch intervals regularly return and peat, be the diſtance of time, one or two ys, or be it only ſome Hours, be-een theſe Fits. In this caſe we have a medy, if methodically adminiſtred, that ill certainly, regularly and effectually ain the Blood in its natural State; d thereby prevent its falling into theſe periodical Diſorders. The Medicine I here intend is the *Peruvian Bark*; a Drug, become of an almoſt univerſal uſe by ſome, and honoured with ſo noble a Character, as to be thought the only known Specifick: But notwithſtanding by its certain and marvellous Effects, it juſtly deſerves our higheſt Praiſe, yet I cannot be ſo uncharitably unjuſt to all other Medicines, as to allow it that Prerogative; by reaſon, I think, if we do not too much narrow our Views, we may obſerve ſome other Drugs to be as certain and regular in their Effects, if but applied with Caution and Judgment. But that I may avoid miſtakes that may ariſe by the uncertain uſe of Words, I ſhall beg leave to explain in what Senſe I here take the Term Specifick. But to do this ſo that it may the better ſuit to my Diſcourſe, I muſt briefly repeat what I have already ſaid, *viz.* That all Medicines may be rank'd under two Heads, either ſuch as Evacuate, or ſuch as only Alter: That by the firſt ſomewhat is diſcharged the Body, ſo that quantity is loſt; by the ſecond only ſome Property, Power or Action is changed; and ſo only ſome Quality is altered. By Specifick then I only underſtand, an Alterative Medicine that Experience teaches us will certainly, regularly and effectually cure ſuch a Symptom, or Symptoms, as are uſually taken to conſtitute ſuch a Species of Diſeaſe, by only altering ſuch Properties that make it, without any Evacuation. And herein I take to conſiſt the difference in the ſenſe of the words Alterative and Specifick: the former is to be taken in a more looſe and general, the other in a narrower and more ſpecial Senſe: The firſt may indifferently be uſed for all Medicines that will, by a continu'd uſe, ſome ways alter or change the Juices, but of whoſe Effects, we are not always certain; the latter may be taken for ſuch an one, as hath been experienc'd effectually to remedy ſuch a Diſeaſe, and ſo Men have a little doubt of its Succeſs. And although Evacuations ſometimes enſue upon their uſe, yet ſuch, by reaſon of their uncertainty, ſeem not to be of their genuine and natural Effects; but only Accidental, not from the Operation of the Medicine, but from the Alterations in the Juices made by it; which now by the Virtue of that be-

ing again changed, come to make their u-ual Separations, which therefore may at firſt run off plentifully this or that way.

III. This being premiſed, the Cortex cannot, as I think, juſtly enjoy the Character of being the only Specifick; by reaſon we have other Medicines that are Alteratives, that may be experienced as certain in their Effects, if but as properly applied, as I ſhall have occaſion to ſhew hereafter. And what hath mounted the ſo celebrated Cortex to ſuch a heighth of Reputation beyond other Drugs, ſeems to me to conſiſt in theſe Things.

Firſt, In that its genuine and certain Virtues in the curing Intermitting Fevers, became as early known here in *Europe*, as the Drug it ſelf; for it was that which firſt brought it hither; ſo that Men, from its Uſe here, being aſſur'd of its Excellency, entirely depended upon it; and therefore have not ſo maimed it by Preparations, as is uſually done by other Drugs; but have kept it to its native Purity, whereby it's certain Effects are better diſcover'd, and more confirmed.

Secondly, In that its proper Uſe is in ſuch Diſeaſes as are eaſily obſerved, and may be readily diſtinguiſhed and ſo are better known; hence it is duly and properly adminiſtred, and not ſo often miſapplied, as moſt other Medicines are. And indeed this Advantage the *Bark* has above all other Specificks, that it is not often improperly given; for it's true, Uſe being in ſuch a State of Blood, where there are Intermiſſions, or at leaſt Remiſſions, which become ſo eaſily to be obſerved, that Men cannot without very great Inadvertency Err: For whoſe Obſervations can be ſo unwary, or Underſtanding ſo dull, unleſs Men will willfully ſhut their own Eyes, but may diſcern when there is a Fit or not; that is, but may plainly ſee that the Diſeaſed is not always alike. And where that is (I ſpeak of Diſeaſes in the Blood) that this noble Drug is a ſafe and ſovereign Remedy, without any regard what the Symptoms are: As I have abundantly experienc'd.

Thirdly, In that the Symptoms that uſually accompany theſe Intermiſſions or Remiſſions that are cured by the Cortex, are uſually in their Seiſures ſurpriſing and ſud-den, in their continuance Violent, and i their events Dangerous; hence this Dru that thus puts a ſtop to them, comes to b more Celebrated; whereas in the Uſe of o ther Alterative or Specifick Medicines happens directly otherwiſe; for their Vi tues were not ſo early known as the Thin themſelves; but have been gradually diſc ver'd, and for the Reaſons formerly urg have been differently repreſented, ſo th their certain and regular Effects are not we Eſtabliſhed; for altho' a long and contin ed Uſe hath advanced an Opinion of t great Excellency of ſome of them, yet ſo hath been the Cuſtom, Uſage or Faſhion ſo confounding them in Compoſitions, ſo defacing them in Preparations, or adm niſtring them ſo uncertainly, that their t tive Virtues either have not been diſcove or well diſtinguiſh'd.

Beſides theſe Diſadvantages, their Effi cies have been clouded by other Diffic ties; in that they have the Misfortune to eſteemed Specificks in Diſeaſes, where Diagnoſticks have been but imperfectly ſtabliſhed; by which they are ſometimes miniſtred in very differing States of Bloo and therefore cannot produce the ſame h py Effects: From all which Conſiderati it is manifeſt, that notwithſtanding ot *Specificks* are as Efficacious in their Oper ons, as the celebrated Cortex; yet their C racters cannot ſhine in the ſame Luſtre.

IV. The renowned Cortex ſeems to regularly and certainly to produce but conſtant and ſingle Effect, which is the ſerving, keeping or retaining the Blood one certain and unaltered State; when diſpoſed to ſhift and change by Interv and by this means all thoſe *terrible Sympto* that appear in the *Fever Fit*, and wh would have been formed in ſuch a Perio Time, are prevented; for the Symptoms appear in the Fit, ariſing from the Com tion of the Blood, the Commotion b hindred, the Symptoms cannot appear; it is manifeſt the curing the Sympto but an accidental Benefit ariſing from Uſe of the Cortex, becauſe no one S ptom that appears in the Fit of an Inter ing Fever, is cured by this Drug, wh

Exists independently of such Intermissions. Thus neither that Horrour or Rigour that sometimes may be observed in the Beginnings, nor that Sickness, Loathings, Reachings or Vomitings in it; nor those *Pains, Inquietudes, Uneasinesses, Deliriums, Phrensies, Coma's, Convulsions*, or so forth, that do sometimes accompany it; nor that Heat, Thirst, Burnings that are so common to it; nor that Sweating after it; neither one or more of these will ever be regularly and certainly remedied by the Cortex, but when they accompany such Intermissions. And on the contrary, Intermissions will be cured by it, although they are not attended with these usual Symptoms.

V. Alteratives taken in a more general, and Specificks in a more special Sense; for such Medicines that cure Diseases without Evacuation, it will be clear that their Effects or Operations must be bounded to one of the common Fluids, *viz.* Either Blood or Spirits, and cannot immediately reach to any of the appropriate Juices; by reason such Juices are only Separations of such parts of the Blood as will pass the *Secretory Vessels*; and such parts having passed them, may be discharged; but cannot be altered but by the Blood, from whence alone they are derived, whereas the Spirits, altho' separated from the same Blood, yet being the Instruments in Sensation, and of all Organical Motion, may and are immediately operated upon, not only by external Objects in Acts of Sensation; but also by Medicine itself, as is particularly evident by the Use of *Volatile Salts, Fætid Smells*, and such like, in *Fainting-Fits*, and what we call *Hysterical Fits*, which being but applied to the Nostrils do presently betray their Effects upon the *Spirits*, by the hasty Change that is often perceived by the Diseased; but of this and the Reasons more largely in the next Chapter.

VI. The noble and almost infallible Virtue of the renowned Cortex, solely depends (as I apprehend all other Medicines do) upon its true Use and timely Administration: For altho' it is properly befitted to cure Periodical Disorders in the Blood; yet it will not always perform this, for whensoever intermitting Commotions in the Blood, are excited from some Cause, without the Blood, the Cortex is but an ineffectual Remedy, as hath been often experienced by its insuccessful Use in *Hectick Fevers*, which although usually occasion'd by some putrid Matter contain'd in the Lungs, yet frequently appear more violent at one time than other. The same may be observed concerning Disorders that seem to be originally derived from the *Spirits*, for the circulatory Motion of the *Blood* depending upon the Vibration of the Heart, and the Heart being moved by the *Spirits*, the Motion of the *Blood* will be altered and disturbed by the *Spirits*; and these sometimes falling into periodical Disorders, the Motions of the Blood become perplexed: This Commotion, altho' Periodical, not being began by the *Blood*, will not be removed by the Bark.

By all which it appears, that the Efficacies of this so much renowned Drug, does not consist in any Specifick Virtue of curing this or that Disease, or this or that Symptom, but only in detaining the *Blood*, from falling into Disorders: And that no Virtues are derived from it, unless it is rightly applied; and therefore is endowed with no more Efficacies than other Substances, since the same may be affirmed of divers other Medicines; for the Effects of *Opium* are as certain, that of some *Volatile Salts, Castorium* or *Fætid Gums* as sudden, some *Astringents* as regular, Steel as constant, and such like. It is true, these and several others are oftener ineffectually administred, for Reasons already urged; but yet notwithstanding these Difficulties may be overcome, if we will but apply our selves to proper Methods; and how far too much Precipitancy, by an overhasty desire to do present Service, may be a Bar to it, I only offer as a thing not unworthy to be consider'd; for, perhaps, by too eager a Zeal of doing good, we may launch out into an Ocean of Uncertainty, before we have Needle or Star safely to guide us; whereas, sometimes, by a little Delay, Nature plainly shews which way she is to be reliev'd.

VII. This farther is very remarkable in this most excellent Drug, that it is always best in its pure and natural Dress, never as

far as I could diſcover, bettered in its admirable Virtues, by any pompous Additions, or ſpecious Compoſitions, but ſometimes hindred by them; never mended by any elaborate Preparation or Chymical Proceſs, but often robbed and ſpoiled by ſuch; for as it ſeems not very likely that its ſecret and peculiar Excellencies ſhould be ſtrengthned by the pompous Addition of different Subſtances; ſo neither does it ſeem probable that its ſpecifick Efficacies, which muſt neceſſarily flow from ſome peculiar Texture or Configuration of its minute Part, ſhould be bettered or improved by Chymical Proceſſes, which muſt alter its Texture, and change its internal Conſtitution. For if all the Powers and Qualities of Subſtances ariſe from the internal Conſtitution of their minute Parts, as reaſon Demonſtrates, and fact Proves, then it is manifeſt, by altering or deſtroying the Texture, from whence the Powers proceed, the Powers themſelves muſt be altered.

And that the chymically analyſing Subſtances does this, is apparent, in that the Parts into which it is by this Art reſolved, bear no reſemblance to the whole; for as the alteration of the Texture of a Subſtance brings a manifeſt change in the Qualities; ſo a change in the Qualities prove an alteration in the Texture. For if Subſtances differ from one another only in the Size, Figure, Motion, or Reſt, Order, and Poſition of their minute Parts; and their Powers and ſenſible Qualities proceed from them; then it is plain if the firſt are altered, the ſecond muſt be changed. And that this, in Fact, is ſo, clearly appears by chymical Preparations, where the Original or Native Qualities or Powers of ſuch particular Bodies, as are thus analyſed, are often changed and loſt, and new ones thereby acquired, extreamly differing from the former; as may be moſt notoriouſly experienced in moſt of the elaborate Preparations, whether made upon the Subjects belonging to the Animal, Vegetable or Mineral Kingdom; in many, if not in moſt of which, the ſenſible Qualities are not only altered by the Preparation, but alſo the Powers, Effects, or Operations which they would have had upon our Bodies, as Medicines are alſo changed; ſome Things by theſe proceedings, becoming, perhaps, violent Emeticks or Catharticks, that were in their Natures neither; or perhaps are changed from being ſuch, to Diaphoreticks, Alteratives, or Cardiacks; I need not produce Inſtances, the thing being ſo well known. And this conſideration enclines me to think, that no real Specifick can well be bettered in any of its native and genuine Virtues, by any elaborate Preparation; by reaſon ſuch Virtues depending upon ſome peculiar Modification of Parts, which, by dilacerating and dividing the Texture of the Subſtance, in order to reſolve it, into what the Chymiſts call their Principles, muſt neceſſarily be changed: For although the *Spagyriſts* furniſh us with many excellent Medicines, yet the Virtues, Powers, Qualities and Faculties of ſuch, are ſo widely different from what were in the Subſtances, out of which they are produced; that they ſeem rather to be derived from the Fire, or Forms and Method of Preparation, than to have been pre-exiſtent in ſuch Bodies. For there appears, in a multitude of chimical Preparations, no more remains of the native Properties of the Subſtance; than there does in Vegetables of the Earth and Water, out of what they are nouriſhed.

But notwithſtanding this mutability in Qualities, and the very relation they bear to our Senſes; yet ſuch hath been the power of Hypotheſes, that Men have renounced the Evidence of their own Faculties, (which every moment gives them Inſtances of the Fallacy) to ſubjugate their Underſtandings to them: For upon the late broaching of Hypotheſis of *Acids and Salts*, Men have immediately conſented, that not only Diſeaſes in humane Bodies, but alſo the Powers and medicinal Faculties of all Subſtances, were to be derived from that duumvirate. And this, notwithſtanding their daily Experience does give them a full Teſtimony that the Powers of Subſtances are not to be known or diſtinguiſhed, by ſuch tranſitory Proofs as ſenſible Qualities; there being no one Quality that entitles all Subſtances that partake of it, to the ſame Uſes; for ſome Subſtances that are in Taſte Bitter, are Emeticks, whilſt others of equal Bitterneſs are either *Cathartick*s, *Hyſtericks*, *Stomachics*, &c. and the ſame may be experienced of

ot

ther Qualities relating to any other Senſe, *viz.* either to *Colour*, *Smell*, or *Touch*.

It is for this Reaſon, that I have often wondered that divers learned and ingenious Men ſhould warmly contend about a Doctrine eſtabliſhed upon ſo precarious Principles, as that muſt be, that derives all alterations in Nature from ſenſible Qualities, (and ſo they do who build an Hypotheſis upon *Salts and Acids*) which are apparently alterable. However the Contrivers or Defenders of this Doctrine have more particularly narrowed it to Diſeaſes; in the explaining of which they very much differ; for the Champions for *Salts* ignominiouſly reproach *Acids*, as the Cauſe of all the Miſeries that diſquiet the Healths of Men; whilſt the Defenders of *Acids* do load *Alkalies* with the ſame Ignominy: And yet, which ſeems wonderful, neither of theſe Gentlemen have, as yet, proved the real Exiſtency of either of theſe Principles in the Blood, which they accuſe of being corrupted in Diſeaſes. For, notwithſtanding it fully appears by the *Taſte*, that ſuch Qualities ſometimes reſide in the *Secreted Juices*, yet that is no Proof, that ſuch were formerly pre-exiſtent in the Blood; unleſs it was firſt proved, that ſenſible Qualities were unalterable, or that theſe were really ſo; for otherwiſe ſuch Qualities may be acquired by the Secretion. And it appears pretty Evident in Fact, that they are ſo obtained, by reaſon the Taſte, the Colour, the Smell, the Conſiſtence of the ſeveral ſecreted Juices, are ſo extreamly unlike the Blood. And if ſuch Qualities that are thus believed to be the Cauſes of Diſeaſes, only reſide in the ſecreted Juices; then are they never to be corrected by Medicines (although they may be evacuated) unleſs they are contained in the Stomach, for Reaſons already aſſigned.

Beſides, how trifling it is to pretend to explain the Phœnomena of Diſeaſes, by ſenſible Qualities that really have no Being but of our Minds; for remove but our Organs, our ſenſible Qualities Vaniſh; the Subſtance in which they are ſuppos'd to reſide, containing nothing beyond the Size, Figure, Poſition, Motion, or reſt of its Parts? And ſurely thus to explain the Nature of Things by our Perceptions, is, in it ſelf, Prepoſterous. But if Men will continue to narrow their Reaſonings for a dear Hypotheſis-ſake, why ſhould not the Qualities appertaining to other Senſes be equally admitted into the Cauſes of Changes in us, as well as thoſe of the Taſte? Why I ſhould conclude, I know the Operations of a particular Subſtance, either upon my own or another Body, better by my Senſe of Taſting, than by that of Seeing, Feeling, or Smelling; or why I ſhould know the Effects of a Body better upon me, becauſe it affects my Palate thus or thus, than it does becauſe it affects my Eyes, my Noſe, my Hands, ſince my Mind equally perceives Bodies operating upon either of them: Or if we ſhould admit the Palate here, the proper Inſtrument to be employed for this end; by reaſon what paſſes into our Bodies muſt go this way, and ſo to be taſted; and accordingly either to be admitted into us, or excluded; yet why only theſe two ſorts of Taſtes, to be thought the cauſes of Alterations in us, when we abound in ſo many others. And then why we ſhould be exalted ſo much in our Opinions of theſe, as to aſſign the Cauſes of our Diſeaſes to the predominancy of one of them; and of conſequence its Remedy to conſiſt in the adminiſtration of the other, when it is ſo notorious that the Medicines that are celebrated to be the moſt powerful in their Operations, do not appear to partake of either of them: For, I believe, the niceſt Palate would be puzzled to diſcover in Native Mercury, Antimony, the Cortex, Opium, and ſuch things, either of them. Beſides, the moſt renowned Patrons of this Doctrine will be aſhamed to own that the ſame Efficacies, Virtues, Effects or Operations upon our own, or other Bodies, will equally flow from all Acids or all Salts: So that by that they admit it is not from the Doctrine in the general, but to Experience only, they owe the Knowledge of their particular Effects. For as to what may be urged from that contrary that is found in the very Natures of Salt and Acids, from that Strife or Ebullition that frequently ariſes between them when mingled or brought together, and how that they ſeem to deſtroy each other; I ſay, here is nothing uncommon, but happens (altho' not ſo much regarded) in ſeveral other Things: For inſtance, ſeveral Subſtances

that are compounded and made up of very differing ſenſible Qualities, Ferment and Heat, and riſe into Ebullitions, and then alter their ſenſible Qualities. Nay, do not all Qualities appertaining to other Senſes, deſtroy each other, as is evident in Colours, Smells, and in other Taſtes, in all which, by the admixture of two differing ones, a third will ariſe, unlike to either?

VIII. But asking Pardon for this tedious Digreſſion, it only remains upon me, before I conclude this Section, to ſpeak a word or two of a ſort of Medicines that are in frequent Uſe in acute Diſeaſes of the Blood, and are compriſed under the Name of Cordials: And theſe ſeem not to be uſed as contributing to the real Cure of the Diſeaſe, but only as a neceſſary Means during the Diſeaſe, to comfort, refreſh, and keep up the drooping and oppreſſed Spirits. It is not my Buſineſs to enter into a worthleſs Enquiry of the Etymology of the Word, and to ſhew how it refers to the Heart, but ſhall here take it in what ſeems to be the modern Acceptation of it, for a Medicine comforting the Spirits. Our Spirits being ſeparated from the Blood, they will in ſome meaſure partake of its Nature; as is obvious in Fevers, where the Blood being diſordered, the Spirits ſoon become ſo too, as appears by the Symptoms that are proper to them. And then as the Spirits may be differently altered, it is clear they may require very differing Medicines to be comforted or refreſhed by. And this appears abundantly evident in Hyſterical Caſes, in which, ſometimes, the moſt offenſive Things are then Cordials; that is, the Spirits that are really refreſhed by ſuch Things, that will diſorder others. In ſhort, there can be no univerſal Cordial, but Things will be ſo as they are applied; which that it may not appear only a bold Aſſertion, I will further illuſtrate it by a notorious Inſtance: Wine and moſt ſpirituous and inflamable Liquours are generally eſteemed Cordials, and are really ſo to moſt in Health, in that the Spirits are comforted, cheared and refreſhed by them; and yet it is plain there is a Time when they are none; for they are ſo far from being Cordials to Men, ſatiated with ſuch Liquours, that the more they are taken, the more their Spirits are oppreſſed, their Underſtandings Confounded, their Stomach Loathed, and their Strength Deſtroyed; ſo that it is clear they are then, to ſuch, no Cordials. And if Cordials are only ſuch things as Refreſh and Comfort, it is plain when we are ſtifled with Heat, and almoſt conſumed with Flames, ſuch things as encreaſe and nouriſh, ſuch Evils can then be no Cordials; and yet few things are eſteemed Cordials, but what will do that; and ſuch Medicines in ſuch Caſes muſt be thought Cordials, I am apprehenſive that may be ſometimes experienced to be fatal Ones; for moſt aſſuredly then the beſt Cordial is to deliver the Spirits from their Oppreſſion, which is not to be done by adding Fuel to the Fire, that is, by encreaſing the Heat; and for this Reaſon, in Fevers, Small Beer, Barly-water, or ſuch innocent and inoffenſive Liquours, will be often found more refreſhing than all the pompous Proceſſes, or chargeable Compoſitions of Pearl Cordials, or ſpirituous Juleps.

Of the Venereal Diſeaſe; *a particular Tract from* Muſitanus; *Of the* Gonorrhœa, Mercurials, *and* Salivation, *from* Paxton; *And of the confirm'd Pox, by* Blanchard, Michael Torres, *&c. Together with an account of the* Veneral Phthiſick *or* Conſumption.

I Shall not trouble my Readers to give an account of the Names and Origine of this Diſeaſe, or the time in which was firſt known in theſe or any other rts of the World; ſince they are of no ſigation either as to the Nature or Cure reof; but only ſerve to increaſe Diſputes, d not improve our Underſtandings: Since refore ſuch an Undertaking yields no re- Satisfaction to the World, I ſhall at once ceed to ſhew what the Venereal Diſtem- is.

The *Lues Venerea* is a diſpoſition againſt ture, which is Contagious upon the uch, being occaſion'd by a Poiſon or *Vi-* of the ſame Nature that ariſes from an cer in the *Proſtatæ*, produced by the Corption and Fermentation of the *Semina* of ers Perſons received into the Genital parts both Sexes; upon which one or more of ſe Accidents do follow, *viz.* Heat of U-, or a Virulent *Gonorhœa*, and Running he Reins, Chancres, Bubo's, or Poulains, mours, Boils, Condylomes, Nodes, nds, Nocturnal Pains, Spots, Bliſters, ers, Scabs, Ulcers, Rottenneſs, and a ies of the Bones, Warts, Wrinkles, Shedg of Hair, and many others which pro- from theſe, or may be common to this other Diſtempers.

evertheleſs ſome of the firſt of theſe Acnts mentioned in the Deſcription, may w upon other Diſeaſes, but 'tis obſer- e that when they proceed from the *Pox*, are attended with ſomething that is ſin- , which diſcovers them to be the effect of the *Pox*, as we ſhall ſhew when we come to ſpeak of them in particular, or give the Marks, by which we may diſcern that Diſtemper from other Diſeaſes. It will appear from what we ſhall hereafter Aſſert, that we allow of only one ſort of *Pox*, and here we affirm that what is uſually call'd a Heat of Urine, a Chancre or Bubo, is not of a different Nature, from that which is known by the Name of the *Grand Pox*, as we ſhall thus prove. Firſt, becauſe that Heat of Urine does as infallibly turn to the *Grand Pox*; as the *Chancre*, or *Poulain*, upon a Neglect, or ill management of the Cure. Secondly, Becauſe the *Grand Pox*, and the forementioned Accidents admit of the ſame ſort of Cure. However, at leaſt as they are Malignant and Venereal. Thirdly, Becauſe the *Grand Pox* is nothing but a Collection of thoſe Accidents together, as will hereafter plainly appear.

There is therefore no eſſential difference, betwixt Heat of Urine, Chancres, Bubo's, and the *Grand Pox*, neither as to the Nature of the Malady, nor the Cauſe whence they proceed, nor finally as, to their Specifick Remedy; there is nevertheleſs an accidental Difference, which does conſiſt in this, that the *Grand Pox* generally ſeizes the whole Body, becauſe the Maſs of Blood is thereby Infected; upon which account it may be call'd an Univerſal Pox; and Heat of Urine, the Chancre and Bubo attack but one ſingle Part, either for that the Venereal *Virus* has not been carried far, ſince it was firſt communicated; or that Nature has expell'd it,

by

by a vigorous Influence, and as it were by way of an imperfect *Criſis*, as may be ſeem in Bubo's, or finally, by ſome other Accidents, and therefore this may be call'd a Particular Pox: In which there is alſo a notable Difference, as to the manner of uſing a Specifick Medicince, and ſome other Circumſtances, which are beſt obſerved in Practice.

'Tis further Remarkable, that there is another ſort of *Particular Pox*; that is to ſay, which lies in one particular part of the Body: For it often happens in Practice, that after the Univerſal Pox is cured there ſtill remains a lurking Poiſon in ſome part of the Body, as in the *Caries* or *Gangrene* of ſome Bones, in ſome Nodes or hard Knots, which admits of no Diſſolution, by the action of *Mercury*, when all the reſt of the Body is cleans'd; and which conſequently requires a particular Remedy: And altho' the *Pox* is the ſame in all Perſons, and at all Times, and has its Specifick Remedy, which is *Mercury*, yet it cannot be well cured, but by Accident, unleſs the Temper, Age, Sex, and other like Circumſtances of the Perſons Infected, be duly conſider'd; for Men are commonly Stronger, Women more Delicate and Moiſt; therefore their *Menſes* muſt direct us in the Choice of our Method when we attempt their Cure.

Thoſe who are of a deep Melancholy Temper are commonly cured with the greateſt Difficulty, becauſe their Humours are more Stubborn and Tenacious, and becauſe they abound in Aduſt, and frequently Auſtere, ſour Humours which are worſe than the other: Cholerick Perſons are eaſily work'd upon, or mov'd to Stool, but ſuffer cold or heat leſs than others; wherefore the *Bile* with which they abound, muſt not be irritated, by a ſudden change of thoſe Qualities; thoſe of a Sanguine Conſtitution muſt be often Blooded, and Flegmatick People much inur'd to drying Medicines: Infants and old Men, being more tender or feeble ought to be look'd after accordingly; neither the one nor the other ought to be Fluxed, eſpecially if they be very Young on the one Hand, or decrepit on the other.

'Tis further alledg'd, that the Times or Ages of this Diſeaſe are to be diſtinguiſh'd *viz.* Its Beginning, Increaſe, State and Declination; but ſeeing it is not an Acut Diſeaſe, and beſides thoſe times are not determined equally, and leave not a regula Courſe, I think it impoſſible to bring th thing into a true Light: Becauſe for Exam ple, there have been ſome Perſons, wh have had the *Pox* for the ſpace of Ten Year or more, without any remarkable Appea ance, or fatal Conſequence; and others wh in the ſpace of three Months, have becom almoſt Rotten. There are ſome who upo a *Chancre* neglected, or ill cured, ſhall for two or three Years free from the conſ quent Marks of the Malady, and others wh in Six Months time be therewith cover'd over, the thing depending leſs or more the Activity of the Venereal Ferment, w which they are Infected, and on their go or bad Conſtitution: In a Word, the tim of this Diſeaſe are ſo uneven, irregular a uncertain, that there can be no ſtand Rule given, by the help of which we m diſcern them, experience being the beſt gu in this matter.

Of the Progreſs of this Diſeaſe, and various degrees thereof; 'tis to be ſuppo that the ſeveral ways how one may get it, be reduced to three; for either the Ma is Original; or it is got by Copulat or laſtly ſome other external Contract. condly, It muſt be ſuppoſed as we hereafter prove that the Cauſe of the is a ſharp fermenting *Virus*, or Poi which without all queſtion is of the na of a Cauſtick Acid, upon which accou can Coagulate or check the Humours, which it is mixed, but eſpecially the F Thirdly, 'Tis to be conſider'd, this Fer is only ſo much the more Active, as 't more exalted by a long Corruption, a it paſſes from a Body more Warm an pen to another, that is likewiſe He and contrariwiſe, that it is the leſs A and conſequently works more ſlowly ſuch conditions happen Oppoſite; in reſpects the Ferment is rendered mo leſs fixed or volatiliz'd: This being ſed, I ſhall give a view of its ordinar greſs.

If a Man has the *Pox* he emits into the *Vagina Uteri* of the Woman a *Semen*, that is full of that *Venereal Virus*, which insinuates it self into, or wounds those parts which are naturally disposed to receive it, as being Soft, Spongy, and very full of small Glands, that are almost imperceptible in their natural Figure and Position; though they be at this day pretty well known by Anatomists, and sometimes do so much encrease, that they may be easily discern'd, 'tis those small Glands that readily imbibe the *Venereal Ferment*, which in them is further Corrupted; that is, it becomes more Sharp, by remaining in them, and seeing it has the Nature of an Acid, it fixes and coagulates the Liquors that are contained in those small Glands, whence there arises a hard small Tumour accompanied with Pain, which is that we call a *Chancre*: And because Heat puts that ferment in Motion, which thereby becomes Sharper, there happens a Corrosion of the Substance, and a small Ulcer begins to grow, the Limits whereof remain yet Hard, and this Ulcer spreads or encreases by little and little; this is what they call a *Chancrous Ulcer*, and a *Particular Pox*, being it only affects one Part: Or if one cases we may take this for the first Degree of the *Pox*, or the first advance that this Venereal Ferment makes. That Ferment always Multiplying, corrupts the ulcerated parts that are next to it, and especially the Liquors that ferment more easily; hence it is that the Blood that is carried by the Arteries for the Nourishment of the Parts, does receive some Particles of that Ferment, and returning by the Veins, communicates these Particles to the Mass of Blood which by degrees comes to be sufficiently dispos'd, by the Accession of such Particles for a Fermentation and Corruption; that is to become it self a Venereal Ferment.

Thus we see how an Universal or *Grand* Pox may proceed from a small *Chancre*, that was only at first a *Particular Pox*: And the Mass of Blood may be corrupted a thousand ways according to the form of the *Virus*, or the Constitution of the Person: If the Ferment be volatile enough, and the Parts have more or Choler predominant in his Constitution, there arises a sort of Turgency, which makes the Humours Glide, sometimes, on the one Side, and sometimes on the other, from whence wandering Pains proceed. If the Ferment be more fixed, and the Person Melancholy, the Blood likewise becomes fixed, and does Coagulate, and its Motion consequently becomes unequal and slow, which is the Cause of Wearinesse, want of Appetite, and decay of Animal Spirits, ill Concoction, and ill Nourishment, together with a Depravation of the Excretions; *Suppression* of the *Menstrua*, *Hemorrhoids*, &c. If the Ferment be very Acid, and the Person Plegmatick, that ferment entangles it self in the Flegm, which it makes Viscous and Thick, whence the Body comes to be Chill'd, puffed up and Bleak. If the Person be Sanguine, it produces an unequal Heat and Effervescence in the Veins and Arteries, leaves Inquietudes, Watchings, Vapours, *&c.* every one may by this discern the Consequences of that Corruption of the Mass of Blood, which cannot be described in so small a Tract.

And this is the second Degree of the *Particular Pox*, or if you please the first step to the *Universal Pox*. 'Tis not easie for the Mass of Blood to remain any long time in this Condition, but discharges it self into all parts of the Body, which it Moistens, and thro' which it passes by a continual Circulation: And such discharges always happen with a great deal of inequality. For it is a constant Maxim, in the admirable Oeconomy of the Body, as 'tis every where else, that the stronger over-powers the weaker; Nature that has a continual Propensity to disburden it self when oppress'd, though it be provided with ordinary Passages, for expelling the Impurities of the Mass of Blood, yet does not always take the same ways, especially when she is strugling with an Adversary that treats her with the greatest Violence.

And therefore if the *Venereal Ferment* be, though in a very small Quantity, in the Mass of Blood it may be push'd on by heat to the Glands of the Emunctories, though by reason of its Weight it goes downward more easily: And thus we see that there grows certain Tumours in the Groin, which are call'd *Buboes* or *Poulanes*: Sometimes the

ſame Matter is carried towards the Armpits, and frequently towards the Glands of the Neck, which become thereby very much Inflamed: Sometimes we ſee the *Pox* of ſuch a ſort, that a great number of Glands appear, in which caſe there is ſtrong ground to believe that the *Lympha* and Lymphatick Veſſels have contributed to that Diſcharge, ſeeing that according to the Anatomy of the Parts, the *Lympha* cannot paſs from the Arteries in the Lymphatick Veſſels, otherwiſe than by the Glands, through which it is filtred. If there be a great quantity of the Ferment, the Maſs of Blood diſcharges it ſelf by an Ebullition upon the whole Skin, upon which we may ſee Spots, which are nothing elſe but Venereal Fumes, that by reaſon of their being Groſs, do ſettle on the Surface Bliſters, which in a little time grow Hollow, and turn to Chancres or Scabs, as well great as ſmall, Tetters, Boils, Warts, *&c.* according to the predominant Humour. If the Blood diſcharge by Sweat any Serous Humours betwixt the Muſcles, theſe Seroſities by picking the Members do cauſe a Pain that is like a Rheumatiſm. If theſe Seroſities run a long the *Membranes*, or *Nerves* or the *Perioſteum*, they cauſe fix'd Pain; ſuch as are commonly call'd Nocturnal, with which thoſe who have a Confirm'd *Pox* are miſerably Tormented. If thoſe Seroſities affect the Joints, they ſhall excite the *Venereal Gout*. If that ſerous Matter ſettle at the Roots of the Hair, it cauſes by corroding the Roots, the Hair to fall off. And this is another, or rather the utmoſt degrees of the *Pox*; if thoſe Seroſities grow hardned and confirm'd upon the Bone they produce Nodes, and after that a *Caries* or Corroſions of the Bones, eſpecially if they ſink into the Subſtance, and penetrate the Marrow. 'Tis true there is another degree worſe than any of the former, becauſe it makes the Diſeaſe incurable; and the Patient is unavoidably loſt, which is when the virulent Matter diſcharges it ſelf on a noble Part, and corrupts it: For beſides that, the loſt Subſtance can never be repaired; the bad Symptoms that accompany this *Pox*, and the Condition of the part affected admit of no Specifick. 'Tis evident therefore that there are ſo many degrees of the *Pox* as it makes advances to take deeper Root, and that from the Surface it paſſes to the Maſs of Blood, from thence to the Fleſh, from the Fleſh to the Membranes, and from the Membranes to the Bones. Nevertheleſs all theſe degrees which I have deſcribed, do not keep the ſame order, for oftentimes it paſſes from one Degree to another imperceptibly; and ſometimes there is a Gangrene or *Caries* perceived in the Bones without the precedency of other Accidents, and this ariſes from ſome particular Diſpoſitions of the Ferment, or of the parts of the Body. So that one part makes a greater reſiſtance than another, and the ferment makes a longer in one part than in another.

'Tis eaſie by this example to judge of the progreſs and degrees of the *Pox* in all other kinds: I ſuppoſe that a common Woman has this Diſeaſe, and though ſhe were not infected, if ſhe has a particular Converſation with many Men, the mixture of many different *Semina* may occaſion ſuch a Corruption in the Paſſage of her *Matrix*, that will degenerate into a proper Virulency. But if the Venereal Ferment which is in the Paſſage of the common Woman be an inſidious *Virus*, and the Paſſage of the Yard which made a Penetration be ſufficiently Open, that *Virus* being put in Motions ſhall enter the *Urethra* ulcerate that part firſt, and ſo by degrees reach the *Proſtatæ* Glands, cauſing there an Inflammation and Acrimony; and this makes the firſt degree of the *Particular Pox*, which they call Heat of Urine, and afterwards a *Gonorrhœa*.

This Venereal Heat of Urine may continue in ſome a longer, in others a leſs time without producing the *Grand Pox*; becauſe of the effuſion of ſome other Humours with the *Semen*, that proceed as it may be ſuppoſed from ſome Ulcers, and carry off a part of the Venereal Ferment of thoſe Ulcers, and blunt the activity of what remains there, whence it comes to paſs that in ſuch a caſe, 'tis ſomething ſlow in its Operation; but when that ferment is volatiliz'd or raiſed by Heat, the Blood which paſſes through thoſe Parts, gradually attracts into the Maſs of Blood, ſo many Particles as are ſufficient to corrupt it. If the Venereal Ferment is yet more Volatile, it paſſes not only

the ſeminary Veſſels, but without any ſtop, into the adjacent Veins, and mixing it ſelf with the Blood, corrupts that which is next to it, and ſo on till the whole Maſs be infected, and thus there is an *Univerſal Pox*, when there was no other Symptoms that preceded, which is commonly very ſurpriſing, and very much deceives the World. But if Nature be ſtrong before this ferment is multiplied in the Maſs of Blood, 'tis ſeparated by way of *Criſis*, and forced towards the Glands of the Groin, where there grows a Bubo or Poulain, and ſometimes together, when the Matter is Exuberant: This may happen when the heat is ſo ſtrong, and the ferment ſo Volatile, that it is expelled through the Pores, with the Sweat, without the help of Medicine; but it is very rare to meet with ſuch a lucky chance. After this I hope it will be eaſie to conceive that in what way ſo ever this Diſeaſe is got, it makes very near one and the ſame Progreſs, that is, the Venereal Ferment acts by Degrees, beginning at that place, which it firſt ſeiſed, diffuſing it ſelf inſenſibly into the neighbouring parts which it Corrupts, and theſe corrupting others, until the whole Body be involved in the ſame *Cataſtrophe*

'Tis evident that theſe Symptoms can proceed from none other, but a cauſe that is ſharp, biting and coagulating, for the *Chancre* begins ordinarily with a Hardneſs, that denotes the Coagulation of ſome Juice, and then it becomes another, and this is made by Corroſion. In Heat of Urine there is an Inflammation, Pain, and Ulcer, which ſhews an Acrimony, the Nodes and Glands proceed from the thickning and coagulating of ſome Liquors that lie all along the Bones, and in the Glands with which our Bodies abound. The itching that accompanies Scabs and Tetters, does manifeſt the ſharpneſs of a corroſive or cauſtick Salt to be the Cauſe, and the *Caries* of the Bones proves the ſame.

The effects of the Venereal Ferment do manifeſt that it is Acid, or Acrimonious ſince 'tis evident that it condenſes and coagulates the Humours, excites ſharp and piercing Pains, corrupts the Fleſh, Membranes and Bones, as much almoſt, as other Acids; and ordinarily without any Blackneſs or Gangrene, whilſt that Corroſion or Corruption that proceeds from *Alkaliſate* Salts is always attended with a Blackneſs, Mortification, and a Gangrene, as in the Plague, the reaſon whereof is, that an *Alkali* is produced by the force of Heat, it is by ſo much the more Fiery and Agile, as the Heat from which it did proceed was Violent; nevertheleſs it does not follow, but that a Gangrene may ſometimes ſeize ſuch parts as are infected with a Venereal Diſtemper when the Body is much Heated, abounds with Choler, and is under a Fever at the ſame time, but eſpecially when one is careleſs of himſelf, or takes hurtful Medicines, as we have ſeen ſome Patients, who had fallen into ill Hands, but that happens by Accident, the Acid of the Venereal Diſtemper being in leſs Quantity, or weaker than the *Bile* which is an *Alkali*, for in that caſe the *Alkali* is Predominant, and being irritated by the Acid, produces effects contrary to thoſe of the Acid: And likewiſe 'tis from this various Mixture, and their different Proportions, whether in Quantity or Vigour, that we ſee in the Venereal Diſtempers ſo great a variety of Symptoms, and are frequently miſtaken in our Judgment about the Nature of that Diſeaſe, and the effect of the proper Medicines; wherefore 'tis needful to make our Obſervations with great Care and Conſideration, and not to imagine that all Patients are to be treated or cured the ſame way.

'Tis ſometimes eaſie enough to diſcover the *Pox*, eſpecially if one has had ſome Experience: But it often falls out, that the Signs which appear are ſo obſcure, ambiguous and equivocal, that it is very difficult, and frequently impoſſible, even for the moſt Judicious and Experienc'd to know it; I am reſolv'd therefore to lay down the moſt certain Rules, by which this Diſtemper may be diſcerned, and I ſhall give good advice to thoſe who have had the Misfortune to get this Malady, that they may ſhun the Ignorant, and avoid all Impoſture. Heat of Urine is not hard to be diſcern'd in Men; 'tis ſomewhat more difficult in Women as ſhall be ſhewn: We ſhall alſo ſpeak of a Bubo or Poulain, with the *Chancre* each by it ſelf, as a *Particular Pox*.

I have already hinted at the way to diſtinguiſh that from the *Univerſal Pox*, wherein I laid down the different Degrees; which I think was ſufficient ſo far as to prevent Miſtakes about it, it being obſervable in doubtful Caſes, that we muſt always preſcribe ſome remedies by way of Precaution, provided they be no ways hurtful to the Patient. For example, a Nurſe by giving Suck to an Infant that has the Venereal Diſeaſe, has got a *Chancre* in one of her Breaſts, and has had it for ſome time, never thinking of it, or dreaming of a Cure, although you have no manifeſt Signs, that this *Chancre* has infected the Maſs of Blood. Nevertheleſs it is very hard to conceive, but that ſome Particles of the Ferment have glided into the Blood, 'tis prudence not only to mind the particular Cure of the *Chancre*, but alſo to preſcribe ſome Medicines for cleanſing the Blood, as ſome Doſes of *Mercurius Dulcis* mixed with Purgatives proper to the Conſtitution; or ſome ſlight Diet and Regimen, ſuch as may be found hereafter in treating of the *Chancre*, or Univerſal Cure.

And this is a Rule that is very uſeful in the cure of the *Particular Pox*, that is, which only affects one ſingle part. As we muſt not neglect the Remedies of the Precaution; for the Depuration of the Blood, which may have received ſome Particles of the Venereal Ferment, during the time that neceſſary Medicines are apply'd to the part Affected; ſo we muſt not proceed to the great Remedy, ſo long as we have no certain marks of the *Univerſal Pox:* I call that the Remedy which cauſes a *Salivation*, which I believe to be moſt Natural and proper for curing the *Univerſal Pox*; concerning which I ſhall now give the Rule.

When a great number of ſigns do appear, as a *Chancre*, Heat of Urine, Pains in the Night, Nodes, Glands, Scabs, Chancrous Ulcers, and others mentioned in the Deſcription of the *Venereal Diſtemper* in General; every one may know it to be the *Pox*. If there be a *Chancre* and Botch in the Groin, one whereof does follow upon the other, it is a ſign of the *Univerſal Pox*; for 'tis very evident that ſuch a thing cannot happen, unleſs the Maſs of Blood be infected: And it is the ſame when there is Heat of Urine, and a *Chancre*, or Heat of Urine and a Poulain, or Botch in the Groin. If one of theſe three, a *Chancre*, Heat of Urine, or a Poulain is accompanied with ſome other Sign, as ſome Nodes, Glands, Pains, Scabs, Virulent Tetters, Caries of the Bones, 'tis a mark of the *Univerſal Pox:* And alſo when there is no *Chancre*, Heat of Urine, or Poulain about the Perſon, if it appear that he was either neglected or ill cured, if any of thoſe Accidents ſupervene, as Pains, and eſpecially about the middle of the Arms or Legs, a great Scab that is no ways like to an ordinary one, but eſpecially if it happen on the Head, or any virulent Ulcer without an external Cauſe, it may be believed to be the Pox: Nevertheleſs a Woman may have her *Whites*, which may be taken for a virulent *Gonorrhœa*, and ſhe may have at the ſame time Pains, which ſhall not conſequently be the *Pox*, unleſs at the ſame time when ſhe has her *Menſtrua*, the *Whites* flow with the ſame Virulency, then ſhe undoubtedly hath the Venereal Taint; and therefore on ſuch occaſions 'tis needful to proceed wiſely in Buſineſs, and ſtudy to underſtand perfectly the Heat of Urine.

If there be any *Chancre* in the Secret Parts or Breaſts by it ſelf, or by Medicines, and that *Chancre*, after a conſiderable time come again in the ſame place, without any manifeſt Cauſe, there is ſome reaſon to believe that the *Pox* has paſs'd into the Maſs of Blood; but if the *Chancre* return in another place, though never ſo near to the firſt, 'tis ſo without doubt. When the Body is cover'd with Bliſters, and theſe Bliſters are turn'd into *Chancres*, that is to ſay into round Ulcers, the ſides whereof are hard, and the middle ſomewhat White, there needs no other proofs to aſſure us of the Pox. Pains alone over all the Body, in the middle of the Members or Limbs, or Nodes or Scabs on the Head, which happen after keeping company with infected Perſons are marks of the *Pox*. If Pains be in the Joynts, it requires a more ſtrict Examination, and the Patient ought not to be treated, as if he had the Venereal Diſtemper, unleſs there be a Concurrence of more evident Signs, becauſe that may be a ſingle *Gout*, and the ſame is to be ſaid of a *Rheumatiſm*. And herein 'tis very eaſ

aſie to be miſtaken; for the *Pox* is often oncluded under the Name of the *Gout* and *Rheumatiſm*. Nevertheleſs, ſo long as there re no other Signs, as *Chancres* virulent Ulers, great Scabs, Nodes, or the like, tho' he Pains happen after an unclean Converſation, the Patient is not to be expoſed to e great Remedy: And the Nodes that lie ear the Joints in *Gouts* give no aſſurance of e *Pox*, if they are not accompanied with ther Signs; for ſuch Nodes are often ſeen Gouty Perſons, who are not liable to the aſt ſuſpicion of having that Diſeaſe: An tolerable Pain, and ſuch as has not yielded to ordinary Means, has paſſed frequently the *Pox*; but in that caſe 'tis upon ſome ſſurance that the Party has had ſome *Chan*e or Heat of Urine for a long time, from hence it is concluded that it proceeded.

But upon ſuch occaſions as that, he who ows himſelf to be under thoſe Circumnces, does very little tender his own alth, if he do not conſult with the moſt le Men; and thoſe whoſe profeſſion it is cure the Venereal Diſtemper, will have ſenſe of Honour and Conſcience, if they not upon mature deliberation undertake Cure. But no Perſon ought to be untaken, as having the Venereal Diſtemper, long as no convincing ſigns thereof do ear, otherwiſe this were to undertake Cure without knowing the Diſeaſe, and tend to reſtore a Man to Health, without aſſurance he is Sick.

f the Maſs of Blood be ſeaſonably corted, it may be depurated by eaſie Meds and gentle Medicines, ſuch as evacugently, or promote Perſpiration, with ſſive heating of the Body, for which poſe we ſafely uſe *Mercurius Dulcis*, a, Caſſia, Cream of Tartar, Volatile Salt Vipers, Amber, *&c.* Diaphoretick Antiy, or the like. There are alſo ſome caſin which 'tis far better to uſe gentle ans, when we are not fully aſſured of Venereal Diſtemper, as for example; one has been cured in appearance of *Chancre* or Heat of Urine, if wearineſs out Labour, loathing of all manner of , an indiſpoſition to the Venereal Ado follow, there is great probability ſome virulency is tranſmitted to the Maſs of Blood; nevertheleſs, ſeeing theſe when ſingle are but doubtful Signs, and may very well be the forerunners of ſome other Diſtempers; I think it would be raſh to ſalivate this Perſon, and therefore gentle means is more preferable.

As alſo if nothing appears, but ſome Piles or Warts in the ſecret Parts, without any other Sign, 'tis not to be thought the *Pox*, becauſe thoſe accidents in that place do frequently proceed from a decay and weakneſs of thoſe Parts, through a long and common uſe of Venery: But if together, with ſuch Signs, there be ſome *Fiſſures* which run towards the *Anus*, *Chancrous Hemorrhoids*, and Warts in other Parts of the Body; in ſuch a caſe there is ſufficient aſſurance of the Diſeaſe: If there be *Chancres*, with a *Caries* of the Bone in the Palate or Noſtrils, I mean ſuch *Chancres* as are perceived in Perſons who have the Venereal Diſtemper, which differ very much from thoſe call'd *Cancers*, 'tis call'd the *Pox*, and is very hard to be cured. If there be a line of Pimples that croſs the Forehead, which begins with the impreſſion that the Hat makes, and which does not diſappear with a Scab on the Forehead, Face or Head, or Spots in other parts of the Body, if the Party has had any ill Converſation with Women, he may very well ſuſpect it to be the *Univerſal Pox*.

After what has been ſaid, it will not be difficult to find what is the Prognoſtick of this Diſeaſe, for after having examined, if the *Pox* be Original, or contracted, together with the difficulties which may ariſe from the Conſtitution, Age, *&c.* And by conſidering what was ſaid concerning its different Degrees, it will be eaſie to judge that it is ſo much the more difficult to cure, as it is the more rooted in the Body; and therefore ſeeing the laſt degree is that of a *Caries* or Rottenneſs of the Bones, 'tis alſo that which is moſt hard to be cured, eſpecially when that *Caries* is in the Skull or Noſe; I will alſo ſay that 'tis ſo difficult, that the Cure thereof ought not to be expected by any uſe of bare *Mercurials*; becauſe they none of them reach the *Caries*, ſo as to deſtroy and remove the Venereal Ferment that adheres to thoſe Parts. I know by experience that the ſureſt courſe that can be taken

in this kind of *Pox* as by way of *Fumigation* or Vapour which reaches the infected Bones; but seeing this method is somewhat dangerous, and may have ill Consequences, it requires both Judgment and Dexterity to accomplish it.

The Venereal Disease is not commonly Mortal; there have been some who have had it 30 or 40 Years, and when they die it does not so much proceed from this Disease, as from some others, contracted by the Disorders and irregular Courses used in the Cure thereof, or the alterations made by time, and the Constitution or Habit of the Body. Besides, it too commonly happens that the most part of those who are in this Condition, do not suffer themselves to be treated as they ought to be; some are backward, because they have not Money enough to pay for their Cure, others because their business do not permit, a third because they are in the hands of such as have no Skill, or at least want Honesty, to compleat a Cure; there are some Bodies of some singular Dispositions, that *Mercury* cannot produce the desired effect upon them; notwithstanding all the precaution and means that can be used. Therefore it often fails out by reason of these Faults or Impediments, that the Venereal Distemper is not cured, but only its Symptoms, and the some of the Venereal Ferment does still remain in the Body, which in process of time lodges and entangles it self in the Humours in such a manner that some inconveniences do afterwards ensue; which are not direct a *Pox*, though they have in effect sprung from it, as their proper Fountain: From thence it is, that there are so many Hereditary Diseases, so many scrophulous Tumours, so many old Ulcers, so many Gouts and Rheumatisms, so many *Whites* among Women; and in a word, from thence arise the most part of those Diseases, which we observe in Families, and which unhappy have only ordinary means apply'd to them because their source is concealed, and the Physicians themselves many times, dare not be inquisitive concerning their Original.

Of Mercury; *and if it be the Specifick Medicine for the Venereal Distemper.*
From the same Authors.

NOT to stand upon the Etymology that Authors have given of *Mercury*, or its Name, Influence, *&c.* I shall only say *Mercury* or Quicksilver is a Metallick Liquor, the Nature whereof is as wonderful as it is singular, for it is extreamly heavy, coming the nearest to the weight of Gold, which is the most ponderous of all Metals, *&c.* Although *Mercury* is an homogeneous Body, and it is as easie to separate the Principles that compose it as those of Gold, tho' this principal Metal contains such as are very closely United and well Digested, and those of *Mercury* are not so strongly joyn'd, because it is only a crude imperfect Metal, or rather a substance that resembles a Metal; nevertheless Reason and Experience prove that it contains, first a great deal of Acid Salt, very like that which is in Sulphur Mineral, which is known by distilling by it self; notwithstanding this, *Mercury* may sometimes operate not unlike an Alkali but upon a quite different Reason, which is because its Salt is fetter'd by a great deal of *Sulphur*. There is also contained in *Mercury* a subtle and volatile Earth, a Metalline Water, which makes it Fluid, and a Sulphur which is its proper *Mercury*.

It is Ponderous, because it abounds with Salt, and experience shews that Liquors are by so much the Heavier, as they contain the more Salt, and though we cannot extract the Salt there from any more than from some other Metals, neither can we extract Salt from Glass, though we know that there is a great deal of Salt *Kali* therein; which shews our want of Skill or Art to perfect that of which our Understandings are

red: *Mercury* is Volatile, and the leaſt re makes it Evaporate, it is likewiſe Opa-us, becauſe it has ſtraight Pores, and ſuch never can be diſpoſed in a right Line, ithout changing the Nature of *Mercury*, ing compoſed of Spherical Particles that in a perpetual Motion: It is penetra-g, becauſe it eaſily divides it ſelf into oms, and is always a moving: It reſolves umours, and diſſolves Flegm; becauſe it as aforeſaid penetrating, and compoſed of Acid, and of *Sulphur*, which are very oper Diſſolvents, by reaſon Flegm con-ns much of an Acid, wrap'd up in un-ous Matter, and Tumours proceed from egm made thick and hard by an Acid, therefore the *Mercury* diſſolves it. *Mer-y* produces cold Diſeales in ſome Perſons, is a great Enemy to the Brain and rves, eſpecially when it is taken crude ill prepared: On the contrary, it heats me others by accident, when it is unskil-ly mixed with Purgatives, or prepared th ſharp Ingredients that make violent itations, which raiſe an effervescence in Tumours.

Mercury excites *Salivation*, becauſe when as once enter'd into the Body, the heat uces it into a Vapour, and though mix'd h Acid Salts in its Preparation it ſtill ins its round Figure, ſo that the *Mer-y* is the more eaſily carried to the Brain, en by reaſon of the cold that it meets h there, and becauſe it joyns it ſelf more dily to the Flegm than any other Hu-urs, upon account of the Acid which it tains, and the Salivary Veſſels do always und with Flegm, that is matter of the va, the *Mercury* diſſolves the ſame, and that reaſon is more abundantly evacua-by the Salivary Ducts, and ſeeing the gm does extract the *Mercury*, the extre-y of the Salivary Veſſels is corroded, and wiſe the Glands of the Throat and th thereby ulcerated, whence it comes als that the *Salivation* or Flux is encrea-and that an extraordinary quantity of m iſſues out of the Mouth, till the ſame m has waſh'd the Ulcers dry, and ſo *alivation* ceaſes.

metimes *Mercury* does only purge by , and it is thought in ſuch a caſe, that it meets with ſome Alkalious Matter, which makes it let go thoſe Acids and Precipitates the *Mercury* into the lower Parts. It does without doubt proceed from the defect of thoſe Acids, that the *Mercury* not finding enough thereof makes it ſublime to the Head, or otherwiſe there are ſome Perſons who can neither be Fluxed nor Purged with *Mercury*. From thence it is alſo, that one may be well purged with a ſmall quantity thereof, at one time, and that it ſhall have no effect upon him at another, for there is not the ſame quantity of Acids in the Body at all times, which depends on the Diet, the Seaſon and the Paſſions, together with many other Circumſtances, which every one may obſerve, and from which we muſt conclude that *Mercury* acts in ſo many different manners according to the different Diſpoſitions of the Perſon who receives it, or the manner of its Preparation.

It remains that we examine, whether *Mercury* be a Specifick Remedy for the Venereal Diſeaſe. A Specifick Medicine is that which cures a certain Diſeaſe at all times, in all places, in all Ages and Degrees; and ſeeing we have ſhewn that the Venereal Ferment is of an Acid Nature, that it fixes on the Flegm particularly, it may be ſaid, that *Mercury* is the moſt proper Remedy yet known, for the cure of the Venereal Diſtemper; for if it is not become abſolutely incurable by the defect of the Perſon who is tainted therewith, as by the Corruption or Decay of ſome Noble Part, or the Complication of ſome Mortal Diſeaſe; it is reaſonable to believe that it may be compleatly cured.

And ſeeing there is no better Medicine known than this, and that all others which have been hitherto uſed are ineffectual, or in all Caſes, Tedious and moſt dreadfully troubleſome, we are forced to uſe it. We may alſo ſay that *Mercury* is an admirable Medicine for many other Diſeaſes; beſides, I have found by experience that *Mercurius Dulcis* ſublimate is a Remedy that will never do any hurt, if one knows how to uſe it; but it is alſo ſo weak that how little ſoever the *Pox* has taken Root, it is not to be expected that a perfect cure can be effected thereby; yet there are ſome Perſons of ſo good a Conſtitution as to be cured with 20

Doſes

Doſes of it, provided it be mixed with a purgative and convenient Vehicles; for which take the following Preſcription. Of *Mercurius Dulcis* Sublimate, and the Powder of Vipers, of each 6 Drams, Criſtal or Salt of Tartar in fine Powder, with Scammony and Troches *Alkandal* 2 Drams, mix them together with ſo much Powder of Paſe Roſes, as may ſuffice to make up a Maſs of Pills, of which a Dram is to be taken, with your ordinary Diet, Exerciſe, *&c.* I have alſo found by experience that the Golden Precipitate and *Mercurius Precipitatus perſe* may be uſed with very good Succeſs, the Doſe is to 12 Grains, mix'd with a common Purgative, *viz.* the Polycreſt, or the Catholick Pills.

I cannot enough extol theſe Preparations of *Mercury* if faithfully perform'd, for they ordinarily purge by Stool, and ſometimes by Vomit, they muſt not be waſted before they are uſed, for then they will loſe ſome of their Acrimony, which was communicated to them by Fire, without which they will not purge as they ought. They may be taken every third Day, unleſs the Patient have the Looſneſs or Purging in the Morning, in which the Medicine is to be taken: In the Intervals the Patient may bleed if occaſion ſerves. When there are Nodes or Letters, or the Body is dry, Baths muſt be uſed, for Emollition of the Parts for Humectation and increaſing of the fluidity of the Humours, and bringing them to ſuch a Condition as they may eaſily yield to Medicine; all the difficulty is to determine what number of Doſes is requiſite for each Perſon; for though the accidents diſappear early, it does not follow that the Patient is perfectly recovered: And therefore to be ſure ſome Doſes ought to be taken after all the Symptoms are quite vaniſhed, that no Leven may be left in the Blood; a Decoction of *Vipers* may be given for ſome Days, by which means, there will be an inſenſible Perſpiration that ſhall carry off the reſt of the Venereal Poiſon, and that ſhall ſo perfectly cleanſe the Blood, that the Patient will be beyond the danger of a Relapſe.

There is no *Pox* but what may be cured by theſe or ſome ſuch adequate Preparations of *Mercury* internally given, ſuch a degree of it only excepted, where there is a Caries or Putrefaction of the Bones of the Noſe or Skull, which cannot be throughly effected but by a Method that is extreamly troubleſome and tedious: And therefore in ſuch a caſe it is better to *ſalivate* the Patient, that is by means of an Unguent, which I would adviſe no Body to, becauſe of its ill conſequences, beſides it can do no good in ſuch an Exigency, becauſe the *Mercury* does not penetrate ſo far as the putrefied Bone, this *Salivation* muſt be procured by *Fumigation* or *Vapour*.

Of the Gonorrhœa *and* Salivation; *From* P. Paxton, M. D.

UNDER this Head of the *Gonorrhœa* I ſhall likewiſe compriſe a flowing of ſome ſmall extraneous Matter at the Noſe, Ears, or indeed at any other Paſſage or aperture of the whole Body of either Sex, whoſe natural Situations are ſuch, that Matter cannot well lodge, but muſt flow from them: But theſe under this Head being ſo very different in their Cauſes, beginnings and continuance, it may be neceſſary for the better comprehending them, to diſtinguiſh them into two ſorts; as firſt into ſuch as ſeem to have been cauſed from ſomething actually made within us; and ſecondly into ſuch as proceed from ſomewhat received from without us. The firſt of which being ordinarily either the effect of ſome inflammation, which will be painful in ripening, but when once broke, if the Matter meets with no hindrance in its diſcharge is rarely of any long continuance, nor trouble or any danger, for it will ſoon cure, without outward Application; if the Matter ſtops that muſt be removed, as if ſuch Juices were the effect of a ſeparation from ſome ill *Dyſcracy* of the Blood,

they may give trouble, by reaſon that muſt be mended, as may be obſerved from the *Fluor* from Women, and ſometimes even from the *Piles*.

But the ſecond ſort that are affected, by ſomething that is from without, as I think may be particularly inſtanced in the *Gonorrhœa's* got in impure Coitions, there the organical Parts themſelves appear firſt injured by the poiſonous Particles then received, which ſeem to fix firſt upon them: For we may uſually obſerve the *Genitals*, and the parts appertaining and adjoyning to them to be ſeverely afflicted long before there is any appearance of the effects of this poiſon in any of the remoter Parts: Whereas had it immediately paſs'd into the Juices, it muſt have been by them quickly whirl'd about the whole Body: It is not improbable the reaſon may be, that the raging Luſt and haſty deſire of pleaſure felt in Congreſs, may have a power to dilute, or ſomeway to affect theſe parts, as to render them more ſuſceptible of the poiſonous Steams; beſides perhaps the Emiſſion yields a kind of Vacancy for their Reception. And theſe thus injured parts, being ſo far ſeated within us as not to permit of Applications immediately to them, whereby to expel ſuch poiſons, nor to remove or hinder them from corroding and ulcerating the Parts, upon which they fix, they gradually come to ſeparate and make ſuch Matter as conſtitutes a *Gonorrhœa*.

But be it as it will, it matters not as to what I chiefly aim at; for I think it is certain theſe organical parts are uſually firſt affected; and the Blood only afterwards from them, by reaſon of this running by the *Urethra* is untimely ſtop'd by improper Applications, the Blood becomes much the more infected by the Poyſon; as evidently appears by the variety of ſucceeding Symptoms, which will after that ſoon break out in very differing Forms. It is true, the Genital Parts being thus alter'd and injur'd by the Poyſon thus receiv'd; and being continually ſupplied by the Blood with freſh matter, to be converted into ſuch purulent Matter, that flow by the *Urethra*; the Blood afterwards becomes poyſoned from theſe Parts, notwithſtanding their Iſſue is not entirely ſtop'd; however, this ariſing ſometime afterwards, ſeems to be derived, in that the efflux of ſuch virulent Matter, is often by the various Poſtures of our Bodies, ſomewhat for a time retarded; for it is manifeſt ſuch Matter cannot flow with the ſame Freedom when our Bodies are in a place, as when in an erected Poſture.

However, if by repeated Evacuations the Blood is robbed of ſuch Juices, that would have been converted by the thus injur'd Organs into ſuch purulent Matter, that Matter will gradually leſſen, and its Virulency abate, and the Parts will contract and heal, that is, recover their former natural State. This being certainly ſo in Fact, it muſt be one of theſe two Things that occaſions that mighty Difference, ſo often to be obſerv'd in the facility and difficulty of curing *Gonorrhœa's* (ſuppoſing the Perſons affected to be equally governable) that is, either according to the Degrees in the Virulency of the receiv'd Poyſon, or according to the diſpoſition of the affected Perſon. If a healthful Perſon, ſuch a one whoſe Blood and Juices are uncorrupted, that is, in a perfect natural State, be affected, although according to the degrees of its Virulency, it may require more or leſs time, yet it will be remedied without much Difficulty. But if one is ſeverely affected, whoſe Blood and Juices are much depraved and vitiated, and ſo perhaps diſpoſed to preternatural Separations, or perhaps on the contrary, to Inflammations; here theſe organical Parts being thus injur'd, readily become the Receptacles for ſuch *Peccant Juices*; which being farther chang'd by theſe *Parts*, become a new Contagion to infect the whole Body. So that ſuch a caſe may prove a Work of Difficulty, and require great Thought, as well to correct and mend the Blood, or ſo to diſpoſe it as that the affected Parts may be cur'd. For where there is nothing more requir'd to be done, but curing theſe diſeaſed Parts; and the Blood and Body is well diſpoſed for Evacuations, here they alone, if judiciouſly adminiſtred, and rightly adjuſted, will be always found a ſure and effectual Remedy. For the purulent Matter there made, being continually ſpent, and the Parts not receiving proportionable Supplies,

will naturally and gradually Heal, that is, recover their former State, by reaſon the Matter not ſtopping, and the poyſonous Parts waſting, there can be nothing to hinder them, there not being freſh Juices to do it, they being carried and turn'd another way. And any Evacuations in this Caſe, where the Body is well-diſpoſed for them, whether by Vomitings or Glyſters, if ſtrong enough ſufficiently to move the Bowels, and repeated often enough, will here perform what is uſually done by Purging: This I only ſpeak as to their general Uſe, but not Expediency, as being incumbred with more Trouble and greater Inconveniency in both, and contingent danger in the Firſt. And I doubt not but a Salivation, if tried, would equally do it. I would not be miſunderſtood, I do not recommend it. Nay, I diſapprove it; for this Caſe, if judiciouſly handled, can never require ſo ſevere a Remedy: But a Salivation turning the Juices by plentifully diſcharging them another way, muſt of courſe hinder the Parts affected of their uſual ſupply, by which means they may, as in the former Caſe, recover; but of Salivation more particularly in the following Chapter.

Under the third and laſt Head may be compriſed all Diſeaſes proceeding from extraneous Matter, ſo made and contain'd, that it cannot diſcharge it ſelf, nor be diſcharg'd, without maniſeſt Danger to the Life of the Diſeaſed; as when ſuch is prepar'd or collected in the Brain, Heart, or upon the Lungs, or ſuch like, for the Uſe, Structure, or Situation of theſe Parts being ſuch, that the Matter forcing its own Way, would be for the moſt part Fatal; and the Uncertainty and Danger that muſt attend ſuch Operations, have as yet deterr'd Men from attempting them. For as what hath been perform'd in what we call an *Empyema*, does not come up to what we are now treating: Diſeaſes then created by ſuch Matter muſt be incurable.

But ſince Men, waſted in a Conſumption, naturally deſire to preſerve even a wretched and expiring Life; and ſince it is certain they may by improper and irregular Ways of Living, untimely break or cut its Thread; it will follow, that by religiouſly avoiding ſuch things as are Hurtful, and induſtriouſly purſuing ſuch as are only Beneficial, or, at leaſt, Harmleſs, they may ſpin it out to a greater Length. And ſince Methods have been eſtabliſh'd, and Medicines invented for this purpoſe, I ſhall here briefly and impartially, for the eaſe and benefit of Mankind, enquire into the reaſonableneſs of their Uſe: But that I may do this with ſome Method, I ſhall reduce them into theſe two Heads.

Firſt, Such as ſeem principally intended to reſpect the Lungs, that is, the Part immediately Affected.

And Secondly, Into ſuch as only relate to the concomitant Symptoms.

Medicines that may be accounted as belonging to the firſt of theſe, may be again conſidered as of two ſorts, *viz.* Pectorals properly ſo called, and Balſamicks. By Pectorals, I think, may not improperly be underſtood Medicines that have been eſteemed to have a Power to abate or eaſe Coughing by helping Expectorations; that is, the bringing up of ſomewhat that being unnaturally ſeparated or made from the Blood, was offenſive to the Lungs, or ſome Parts in the Breaſt appertaining to them. By Balſamicks may be underſtood divers kinds of Medicines that are ſuppoſed to be endowed with a healing Power, ſuch as are ſeveral natural Balſams, and divers fictitious ones in ſeveral Preparations and Compoſitions.

Again, under the ſecond Head, *viz.* ſuch as relate to the concomitant Symptoms, may be number'd.

Firſt, Either ſuch as ſeem principally intended to reſpect the Diſorder only of the Blood; that is, the hectick Heats, Inquietudes, and by conſequence only the other Symptoms that proceed from thence. And under theſe may be compriſed all ſuch things as are thought to mitigate and aſſwage that as Emulſions, divers Preparations of open and cold Seeds; and if I may name it, ſo it hath been in ſome uſe, the celebrated *Cortex*.

And Secondly, Into ſuch as have been eſteemed not only to cool, but nouriſh alſo, and amongſt the chief of theſe are to be number'd Aſſes, and divers other ſorts of Milk, Snails and their Preparations, and the whole Farrago of this Tribe.

Or, Thirdly, Into ſuch as give only ſome preſent eaſe or relief to the moſt troubleſome Symptoms, whether in the affected or any other Part; and under this Head are only to be number'd Opiates, in ſeveral Forms and Preparations; for by theſe the violent Fits of Coughing are quieted, the uneaſie Nights are paſſed away in Slumbers, and ſome Truce is gain'd from the Troubles of a waſting and wearied Life. Under ſome of theſe Heads, may be comprehended the principal Methods that are in ordinary Uſe in this Diſeaſe: With what Succeſs every one's Experience will beſt inform him, if he pleaſe but to be impartial and heedful in his Obſervations. I ſhall only examine into the reaſonableneſs of them, and what I think may be expected from their Uſe, according to ſuch Principles that are known, and are certain.

Firſt then, as to Pectorals, ſuppoſing, but not granting, them to be endowed with a peculiar Power to lubricate theſe Parts (which, by the bye is, inconceivable) and alſo to help to divide, part or unlooſen tenacious Matter that here ſticks or adheres, and ſo by that means to befit it with greater Eaſe, to be by the help of Coughing diſcharged: Yet in what we call Conſumptions, what Benefit or Advantage can be reaſonably expected from them? Becauſe in ſuch the purulent extraneous Matter is already made, ſegregated and lodged, and cannot be expectorated by reaſon of the Structure and Situation of the affected Part, and not from any unfitneſs in the Matter. So that if Pectorals were of any real Uſe towards the ſeparating ſuch Matter by the Lungs, they could be here of no Advantage; by reaſon that here there is an unnatural and faulty Separation, by which the Body waſtes, and Life is thereby endangered, and why then to be encouraged? But in reality, I am apt to think, there is no ſuch Effect attends them, for if ſometimes they ſeem to facilitate Expectoration, they ſeem to do no more than unlooſen the mixture of the Blood, and in that perform no more than what is common to other Medicines helping Separations. However, in this Diſeaſe we may obſerve that whenever Matter is ſo congeſted as to cauſe Coughing, that part of it that was in the reach of that Motion, will be diſcharged, upon which uſually the Coughing ceaſes, and then by Intervals, repeats as the Parts ſeem by this means ſolicited; and thus returning, it will ordinarily be again brought up, until ſuch time as they, *viz.* the Lungs, become ſo much impaired, injured, or rotted, as they become unfit for ſuch a Performance, and then that Diſcharge ceaſes; not for want of Matter, for perhaps the Lungs are full of ſuch, but want of a Power, Capacity, or Ability of the affected Parts: And thus we may commonly obſerve Expectorations in ſuch Caſes, ſtop before Men die. And that this is ſo, I think appears farther evident in what is call'd *Vomica pulmonis*, where Matter coming to ſuch a Fulneſs, is diſcharged by violent Coughing; which Coughing does again ceaſe until freſh Matter being fully congeſted, it is again occaſioned and then repeats. For whatſoever is brought from the Lungs, muſt be by the Motions of the Parts contributing to Reſpiration; by reaſon what is once ſeparated from the Blood, and ſo without the power of the Circulation, becomes under the Laws of Gravitation, and ſo muſt deſcend, ſo that it cannot without ſuch Aſſiſtance be raiſed up into the Mouth. For this noble Machine, a humane Body being made out of the common Maſs of Matter, and ſo only differing from other Bodies; but as it is more excellently formed, and more divinely faſhioned, does remain in all its Parts incident to the Laws of Motion, whether it be received by Impulſe or Gravitation, as all other phyſical Beings are. It is true, the great Author of Nature hath ſuperadded to this Maſs of Matter, that thus conſtitutes a humane Body, an active Power of beginning, altering, continuing, or hindering Motion in ſome particular Parts that are ordained for ſuch Uſes as properly belong to a free and intelligent Being, as every individual Man may eaſily experience himſelf to have Power to move or not, to walk or ſit ſtill, to do this or not do it: Which Power far tranſcends, and is exceedingly different from any thing that can belong to meer Matter; but yet that Power is limited to ſome Parts only; for ſuch as are immediately ſubſervient to Life, are not

under it. Thus it is not in our Powers to, regulate or alter our Pulſe, the Motion of our Bowels, or ſuch like. Neither can we by any immediate Act of the Will, diſcharge or remove any unnatural Matter, made or depoſited in any particular Part, as not having Organs whereby to do it. If therefore ſuch is prepared or collected in a Part ſo ſituated or formed that it cannot flow out of it ſelf, nor be diſcharged by the Motion of the organical Parts, by reaſon of ſome default in ſuch Parts; to pretend, or to propoſe, to befit this to be diſcharged, which is already in its very Nature fit, ſeems to me mere trifling, ſince there is nothing wanting for its Diſcharge, but a Power and Capacity in the Organ, by which it ſhould be done. For it being here to aſcend, there can be nothing but a force from ſome organical Motion that can raiſe it upwards. And to this it is evident, Pectorals can contribute nothing, and therefore in this caſe can be of no uſe. It is true, there may be ſome things that carry the Name of Pectorals, that may be of ſome ſmall Advantage in the preſent Caſe, ſuch as *Tabulets*, *Troches*, or *Lohochs*, but then not properly for ſuch Ends as ſeem to require Pectorals; but only as being held in the Mouth, and gently ſwallowed, do ſomeways lubricate and pleaſe the Parts about the *Fauces*, that they are not ſo readily drawn into Coughing, whilſt their Effects remains; ſo that ſomewhat may be here offered in Juſtification of their Uſe; but how far that will balance other Inconveniencies that may ariſe by 'em, I humbly offer to be conſidered.

But as to the ſecond ſort that I have termed *Balſamicks*, I can ſee nothing that can be hop'd for, or promiſed by their Uſe. For if they are given with an intention of digeſting, cleanſing, healing, or ſomeways curing the affected Part, they are a Jeſt; for what one Inſtance in Nature can be given wherein the part can be healed or cured, ſo long as the Matter lodges in it? For the Part being the Ciſtern to contain it, How can it be ſo brought together to be healed or cured, when the very Matter that is in it muſt hinder ſuch Agglutination? The very ſuppoſing it is a Contradiction. Neither is it ever attempted in Chyrurgery, where to pretend to heal, before the Matter is diſcharged, would be looked upon as an Effect of the oddeſt Ignorance. It is true, ſome both natural and factitious Balſams, are experienced in Chyrurgery, to be noble and uſeful Remedies: That is, being ſometime applied to a ſore Wound or Ulcer, they ſo diſpoſe and alter the Parts of it, that the Matter that is there made, becomes afterwards digeſted, that is, ſo bettered in Colour, Nature, and Conſiſtency, that the grieved part is experienced to be in a promiſing Condition; but this change thus made in the Sore or Ulcer, by means of which the Matter thus becomes Digeſted, ſeems only done in that the Balſam being applied to the Sore it ſelf, ſo alters the Surface of it, that the *Pus* that is there made, becomes ſo much bettered; for it is evident, the Blood from whence this is by the Sore ſeparated, is not by ſuch an Application mended. So that although Experience teaches us that Balſams thus outwardly applied, are really uſeful Medicaments to digeſt and better Sores, and ſo to diſpoſe them to heal; yet we cannot from thence infer they will be ſo if inwardly taken; by reaſon the firſt proceeds from the immediate Application of them to the griev'd Part, but the laſt muſt be done by altering and rectifying the Blood; between which two ſo different Effects, there is no manner of Connexion or Agreement. Neither will I ſuppoſe this way of Reaſoning be allowed in other Caſes, for if it ſhou'd be taken for a Rule, that any Medicine that will digeſt or diſpoſe a Wound to heal, if outwardly applied, muſt do the ſame if internally adminiſtred: The ſame Effects may with equal Reaſons be expected from all other ſorts of Medicines, and then that which is an Eſcarotick, that is, will ſuppreſs, eat off, or deſtroy, looſe and unnatural Fleſh, if applied to the Part, may therefore, if internally taken, eat off a Carnoſity, or root out a *Polypus*, which, I believe, few will be ſo bold to venture, or ſo vain to expect. It is true, Ulcers, Sores or Wounds, are always found of eaſieſt Cure in ſuch Perſons whoſe Bloods are in a natural and healthful State, and on the contrary attended with more or leſs Difficulty according to the degrees of its Corruption; ſo

that ſometimes there is a neceſſity to cor-
ect and mend that before outward Appli-
tions will have their deſired Effect: But
ere, I apprehend, this will not be always
one by Balſamicks, but by Methods and
Medicines adjuſted to the particular Caſes;
ot but Balſamicks may ſometimes in ſuch
Caſes have their Uſe. Farther, I never as
et, could obſerve ony one internal Exulce
ation that ever could be ſaid to be really
ured by Balſamicks internally taken. In
Venorrhœa's, where the Matter does not of-
en lodge, and therefore if ever of any ſuch
Uſe, it might reaſonably be expected from
hem there. Yet even there I need not in-
ſt upon the Inſtance, it being ſo notoriouſ-
y known, how wretched, how trifling and
ow unſafe they are, if only relied upon;
nd if ever of any Advantage, it is only
hen gave in ſuch Quantity, that they
urge, and ſo only anſwer what would be
one by other Purgers.

The next thing to be conſider'd, is the
econd general ſorts of Medicines that ſeem
rincipally to regard the Symptoms that are
ooted immediately in the Juices, and ſo
re common to moſt parts of the whole Bo-
y, ſuch as are the hectick Heats, with the
Conſequences to that, and the waſting of
he conſiſtent Parts; and theſe Medicines,
although before branched under two ſorts,
yet here may be conjointly conſider'd. A-
mongſt the chief of theſe are to be number'd
ſeveral *Milks*, *milky Diſtillations*, *Emulſions*,
divers preparations from *Snails*, cooling and
oily *Seeds*, with their various Compoſitions,
all which ſeem to be levelled, to cool and
mitigate the hectick Heats, and to nouriſh
and reſtore the *conſiſtent Parts*.

It is moſt certain ſome *Meats* and *Drinks* have a power to heat us, and it is as certain, that when we continue preternaturally Hot, we are not well; and then we covet ſuch things that will cool us. But whether there is any Subſtance in Nature that can really do this, ſhall be our preſent Enquiry. To form a right Judgment of this, it will be neceſſary, firſt to conſider Heat it ſelf.

Heat, when taken as appertaining to a Subſtance, is only the Motion of its minute Parts; but when conſider'd in relation to Men, imports ſuch a degree of Motion that exceeds that of our Senſories.

But altho' Heat is thus taken when applied to Subſtances exiſting without us; yet when we conſider it in our Bodies, we ſpeak of it under another Relation; for not then being able to examine the Degrees of Motion by our own Senſories; we appeal to ſuch things as are often the Effects of Heat in us; and eſteem and judge of Heat by ſuch Appearance. Thus becauſe a quick *Pulſe*, a dry *Tongue*, a high-colour'd *Water*, a ſcorching *Thirſt*, &c. are Effects of what is called a preternatural Heat, (to diſtinguiſh from what is natural) whenſoever we are afflicted with ſuch Symptoms we complain, or at leaſt accuſe our Heat: And whatſoever mitigates or abates thoſe Symptoms are uſually eſteem'd cooling.

All thoſe Symptoms that are uſually eſteem'd the Effects of Heat, are plainly formed by the Blood, and are founded either in the Violence of the Circulation, or ſome defect or fault in the Separation; and therefore always vaniſh when theſe two Things return to their Natural Tempers and Conditions.

Of Salivation *from the ſame Author.*

HAVING thus perform'd what I promiſed, I ſhall only ſay a word or two of *Salivation*; which is an extraordinary and preternatural Separation made, cauſed or effected by *Mercury*, or its preparations from the Blood, by the Salival Glands, and from thence diſcharg'd out of the Body.

But although the Salival Glands are the inſtruments by which this evacuation is perform'd, yet it is not effected like Vomiting or Purging, but by the means of the Blood it ſelf: For the Blood being diſturbed by *Mercury* breaks, colliquates, divides and ſpews out ſome of its parts by theſe Glands

Glands: and that this is the real Method, by which *Salivation* is effected, appears by these following Reasons.

First, In that the Salival Glands have no Motion of their own, whereby to procure or promote this Evacuation.

Secondly, In that there are no Passages by which the Mercury can be conveyed to these Glands, but by the Blood.

Thirdly, In that there appears evident Marks of Disturbance in the Blood, proceeding and accompanying this Evacuation; for it moves and circulates, fluctuates, and sometimes spews out Parts by other Passages, *viz.* Vomitings, Looseness, *&c.*

Fourthly, In that Salivations may be diverted or hinder'd by Purging; that is, by turning that Separation of the Blood that ran by these Glands into the Bowels.

By all which Observations, it is evident, the Blood is first tainted and disturbed by the Mercury, and these Glands only by the Blood, and are no more than the Sinks to carry off the foul Parts of the Blood, which by the force of Mercury are brought this way.

Mercury being observed to have this certain Power to break, colliquate or someway so to affect the Blood, as to cause it to separate, purge, or defecate it self by a Flux thorough the Passages in the Mouth, which discharge continuing for a considerable Time (as Days or Weeks) the Blood has leisure and opportunity to purge and purifie it self; that is to separate, divide from, and exterminate its poisonous, offending, and Disagreeable Parts, and by that means to become more homogeneous and fine.

And as the Blood thus throws off its impure Parts by this Evacuation, so it is plain the Advantages that are received by this Evacuation, are chiefly owing to the long and uninterrupted Continuance of it, and not from any thing specifick in the Mercury, for the Mercury only puts the Blood into this Condition of purging it self; and if therefore the Blood is able to cast out the hurtful Parts, it hath by this means an opportunity of doing of it; and although the usual Method is by the Salival Glands, yet sometimes it happens otherwise.

For it is most certain, such is the Nature of this active Mineral, or any of its Preparations that retain its Nature, that if they are given or applied in Proportion, they will so disorder the Blood as to put it in a state of purging, fretting, or someway spewing out its Parts, I do not say this will be always of Advantage to the Diseased, for that must be as it is properly or improperly applied) neither will it be in the same manner, for that will depend upon the Disposition of the Blood, and the Aptitude of the Vessels, for *qua data porta ruit*, it will break out, or pass where it meets with least Resistance. But, I say, it will always some way so affect the Blood, as to make it spew out some of its Parts, and by that defecate it self. It is true, this will not be equally performed in all Persons, neither in the same quantity, nor by the same Way: Yet this is the certain effect of Mercury, and what it will always do, if administred or applied in Quantity, and but admitted into the Blood.

Mercury is a Substance so opposite and repugnant to the Nature of our Blood, that if received in too large a proportion into it hinders, perverts, and destroys those very Actions and Functions, in which Life consists, and is never admitted into the Mass but it gives some Disorders (in proportion to the quantity of the Mineral, and the Disposition of the Blood:) And by these Disorders, it becomes disposed to make various Separations which are salubrious or dangerous, according to the Course it takes in making them: Wherefore Physicians with great Caution and Judgment, often direct them towards the Bowels by Purgings. And as the real Operation of this Mineral consists in that it disposes the Blood to those Separations by which it purges, defecates, and purifies it self; that is, that it exterminates the peccant, offending, or poisonous Parts by them: It must follow, that the happy Successes to be obtained by its Use, must absolutely depend upon the Continuance and Proportion of the Evacuation, in that the Blood may have time and Opportunity to do it; and not from any thing specifick in it, or in any of its Preparations. It is true, by preparing of it, its poisonous Qualities may be laid asleep, or perhaps

ſtroyed, at leaſt they may be mitigated or leſſened.

But then thoſe Powers, Virtues, or Efficacies, by which it only diſpoſes the Blood to theſe Separations, and by which its happy Effects ariſe; (which ſeem to be the main end in giving of it) muſt likewiſe be either deſtroyed, or in proportion leſſened, by reaſon they proceed from theſe very Qualities: So that then to attain the ſame Effects by ſuch Preparations, they muſt be proportionably encreaſed, or otherwiſe they cannot perform them; and then the Queſtion is, whether they are not equally dangerous? For if they do not, it is plain they have changed their Natures, and ſo are no longer to be eſteemed Mercurial. Beſides, I never yet could obſerve any one Preparation of Mercury that was adminiſtred with real Succeſs, but it hath ſomeway more or leſs diſpoſed the Blood to Separations, that would be ſucceeded with ſome Evacuation, ſooner or later, according to the Power of the Medicine: It is true, that where they have been given in ſome ſmall and trivial Quantity, it hath not always been heeded, by reaſon perhaps ſuch have be endrowned or loſt by intermediate Evacuations.

In a Salivation then, the Blood continually purges and purifies it ſelf by diſcharging ſuch Quantities by the Mouth, and and ſometimes likewiſe by other Paſſages, and during which, it hourly receives ſuch ſupplies of thin and harmleſs Liquors, which readily running out at theſe Veſſels, muſt waſh out, and carry away peccant, offending, or incongruous Parts; ſo that the remaining part of the Maſs that continues red, and circulates, and is only called Blood, which keeps in it proper Conduits, and will not paſs theſe Veſſels, will become ſomewhat more homogeneous and agreeable, although it does not always follow in reſpect of the Man, that it is better'd (which are two different things) for Salivations are not always Advantageous. And in this powerful Operation, the Blood ſeems to do nothing uncommon or extraordinary, for it every Day purges and fines it ſelf by theſe and other Secretory Veſſels and Paſſages, with this only difference, that the Blood by the uſe of Mercury is more diſorder'd, broke, or altered, whereby it is more diſpoſed to Separations; and the Mercurial Particles being received into the Blood in ſuch proportion only, that they are able to create this Diſturbance, but not in ſuch a quantity to deſtroy Life, in hindering the Circulation, are again expelled by theſe Veſſels, as being offenſive and diſagreeable to the reſt of the Blood; and in their Paſſage here, they ſomeways wound, alter, or injure theſe Glands, by which means they heating, ſwelling, and enlarging, do give more liberty to the Blood to run this way; and the Pores or Paſſages of theſe being enlarged, by reaſon they are ſwelled, admit of larger Quantities of theſe Juices, to ſtrain thorough 'em, by which means the Blood more powerfully defecates it ſelf. And this is abundantly confirmed, in that the Succeſs of a Salivation, in ſuch Caſes where it is of real uſe, is always anſwerable to the height and continuance of it. So that in this Operation, the Blood ſeems to do no more than what is naturally performed in all Fluids made up and compounded of different and unlike Parts, for ſuch being undiſturbed, will ſooner or later fine and purifie themſelves, (and this may be haſtened by Art) that is, as they will by a Motion natural and congenite to themſelves, part, divide, ſeparate, or expel their incongruous and heterogeneous Parts; ſo that Motion may likewiſe be intended by the Admixture of ſome diſagreeable Body with it, and thereby its Separations haſtened and encreaſed. With this only difference that ſuch Liquors being quiet and free from an external Impulſe, act in their own natural way, and ſo deſpume themſelves by juſtling and tumbling the unlike parts to the Top, Bottom, or Sides, according to the Laws of *Hydroſtaticks*. But the Blood being hinder'd in this, by the circulatory Motion, by which its parts are continually blended and confounded together, that there is neither ſpace, leiſure, or opportunity for that Performance; the Deſpumation is done by the Secretory Veſſels, which are ſo excellently faſhioned, as readily to let paſs ſuch parts as are uſeleſs or hurtful to the Blood. And when a Secretory Veſſel becomes pained, inflamed, and ſwelled, it ſeems to be more ſuſceptible of theſe Juices, the Blood being called

called in greater Quantities that way, (as appears probable by the unuſual Pulſations upon ſuch Parts) and then being diſpoſed for Separations, it may the better by this Operation deliver it ſelf from all offending Matter.

Whereas in other Evacuations, ſuch as Vomitings or Purgings, which being performed only by the Motion of the Organical Parts, whatſoever is evacuated by them immediately from the Blood, muſt be brought into the Bowels, by that very Motion by which they are made, and therefore can be of no longer continuance than that Motion; the Blood being only forced to ſeparate that way by that their Motion, and not by any internal diſturbance in it made by the Medicine; and therefore ſuch Separations never out-live the Motion of the Bowels, as will appear moſt evident to any one who will but impartially conſider or obſerve them. However, if we but reflect upon the nature of our own Bodies, it will plainly be found impracticable ſo to continue Evacuations made by organical Motion, as to ma e them anſwerable in their Effects to a Salivation: For ſhould we ſuppoſe the Blood to be equally diſpoſed to part with its peccant Matter by theſe Ways, as by the Salival Glands; yet ſuch Matter being diffuſed through the whole Maſs, the Blood could part with no more of it during ſuch Operations, than what could be ſeparated by the Veſſels about the Bowels in that time, for what was not there, could not paſs there; and if we but weigh what Juices during the ſhort time of ſuch Operations, in proportion to the whole Maſs, can there paſs, and what Moiety of noxious Matter with them, we ſhall eaſily collect why a Salivation muſt be in ſome caſes the more powerful, as it is the moſt laſting. Beſides, the parting or ſeparating of offending Particles, ſeems to be a leiſurely Act, being rather hindred than aſſiſted by ſuch Violence as is requiſite to thoſe Evacuations, and to continue theſe, ſeems unpracticable, by reaſon our Bodies are ſo conſtituted, as to require a daily Supply of new Juices for natural Uſes, which muſt paſs into the Blood, which they could not well do, ſhould Purging or Vomiting be ſo continued; by reaſon they would conſtantly di charge ſuch; ſo that although we ſhou eat and drink, yet our Bodies being th defrauded of all Nouriſhment might ſtar Whereas in Salivations; what we take, pa ſes into the Blood before it can be again t that diſcharged; ſo that our Bodies ma receive ſome Benefit by it, and be delivere from thoſe Inconveniencies that attend th other, which are alſo in their very Natur impracticable to be thus continued.

In ſhort, Salivation being nothing in n ture but the Effect of a mighty Separatio made by the Salival Glands, occaſion'd b Mercury or ſome of its Preparations, whi being in its Nature highly diſagreeable our Blood, will ſome way ſo marvelou diſorder it, as to cauſe it to purge, divi from, and throw out ſeveral of its Parts th Way; by the means of which, ſuch peccan morbifick, or poiſonous Matter that was l tent in the Blood, and will aſſociate a paſs off with theſe Juices, is otherwiſe e terminated with them; and this Operati being ſo very laſting, the Blood has there time and opportunity to free and extricate ſelf from ſuch offenſive Matter, and th this is what Mercury really performs in o Blood, appears abundantly manifeſt in th if the Quantity of it be too much enlarge inſtead of a Medicine, it becomes a Poiſo that is, inſtead of curing, it deſtroys; the Blood being diſordered and over-powe ed by the Quantity, being unable to pur and deſpume it ſelf by theſe or any oth Paſſages, it ſwells and expands in its ow Veſſels, by which means its Circulation b comes gradually hinder'd, and at laſt ſuppr ſed, and then the Diſeaſed dies. And thus effects of Mercury are, and muſt be as Proportions are adjuſted (not that all Bod will be equally affected by the ſame Qua tity) for if it be too ſparingly adminiſt or applied in ſuch Caſes as really deſerve uſe, it does too little, as not diſordering Blood enough, whereby it may be empo ered to defecate or purge it ſelf: But if too great a Quantity it does too much, then it puts it into ſuch a State as it ca not rightly Purifie.

Of the Method of Curing the Venereal Diſtemper, and that Salivation is the moſt ſhort and the moſt certain way, provided that the Mercurial Unguent *be not made uſe of to excite it: From Mr.* Blanchard's *Treatiſe.*

IT muſt be agreed upon by all, that the Pox may be cured by all ſuch Methods, as will effectually evacuate the Phlegm, in which the Venereal Ferment does particularly lie, and which will depurate the Blood; and therefore, Sudorificks, Diureticks, Vomits, Purgatives and Salivation are the means that are the moſt proper and convenient for that end.

But after all, I muſt freely declare, that although theſe Remedies be all good, yet Salivation is to be preferred to all the reſt, as being the beſt, the ſhorteſt, the ſureſt, nay I will ſay, the moſt natural Method: for if we obſerve the Oeconomy of our Body, and the ways which Nature has provided for the Evacuation of ſuperfluous Humours, we ſhall find that ſhe voids the Excrementitious Matter that remains after the firſt Digeſtion, with the more groſs Parts of the Bile and the Pancreatick Juice, by Stool; the ſuperfluous Seroſity (after it has ſerved as a Vehicle for the Nutritive Juice, with which all the Parts of the Body are nouriſhed) partly by the Veins, and partly by inſenſible Tranſpiration; the menſtrual Blood by the Matrix; the Hemorrhoid Blood by the Hemorrhoid Veins; ſome other particular Excrements by particular Paſſages, as by the Ears, the Hair, by Expiration, *&c.* And, laſtly, as to the Pituit or Phlegm, the Salivary Veſſels are appointed for the Evacuation thereof: The likeneſs that is betwixt the Pituit and Saliva is well known; they being the ſame Matter, and only differing in conſiſtence; for the Saliva is the firſt Matter of the Pituit, the Saliva is continually ſwallowed down, and when it is in the Stomach, it grows Thick, and in the Digeſtions, it does intermix it ſelf with the moſt Viſcous Part of the Aliment, and is afterwards carried into the Gut called *Duodenum*, where it does continually mix it ſelf with the Bile and the Pancreatick Juice, which make a Fermentation together, by the means of which it does ſo fall out, that the more groſs Parts are precipitated, or forced downwards with the Excrementitious Matter, to be evacuated by Stool, and the purer part is carried by the *Venæ lacteæ* to the Heart, and from thence, by the Arteries, to all the Body, with the Blood, from which it is gradually ſeparated by the conglomerated Glands that lie on either ſide of the *Mandibulum*, and from thence it is carried by the Salivary Conduits, to the Mouth, in which the Pituit that deſcends from the Brain, does mix with it, there being a conſiderable quantity thereof, produced in the Head, by reaſon of the coldneſs of that Part, which Pituit does inſenſibly paſs through the *Infundibulum*, from whence it is filtrated, thro' the Pituitary Gland, into the Mouth, ſo that it is eaſie to comprehend how the Phlegm is carried from all places of the Body into the Mouth, and that by its natural Motion; and therefore, in a Salivation, which is excited by Mercury, the Phlegm being put in a quicker Motion than ordinary, does eaſily draw to it ſelf all the impurities of the Maſs of Blood, and eſpecially the Venereal Ferment, becauſe of its Acidity, as we have ſaid elſewhere, and by that means the Blood is compleatly Purified.

It is true, that it ſeems that the ſweat may effect the ſame; which certainly would be ſo, if we had a Sudorifick, that could without any Violence, ſeparate the Pituit from the Maſs of Blood; but ſeeing it is Viſcous, it is very difficult, to reduce it into Vapours by any Remedies that we know, to the end that it may tranſpire through the Pores of the Skin; and if one will needs attempt it, he muſt heat the Body very much; whereas the Maxillary Glands have naturally a Configuration fit for making this Separation, which is enough (without uſing other Reaſons) to prove, that an Artificial Salivation is only an imitation, and an Acceleration of the Natural.

They alſo who are converſant about this Matter, know by experience, that it is more difficult to ſtop a Flux than to raiſe it, and therefore they who give it by the Unguent do always expoſe the ſick to a mortal Danger, becauſe they cannot meaſure the Quantity of the Mercury, which ought to enter into the Body, for putting that Pituit in Motion, which is not precipitated, and opening the Pituitary Veſſels by little and little; whence it does come to paſs, that a great deal thereof does enter into them at once, which makes the Pituit, and the reſt of the Humours aſcend to the Throat and Head, and produces Inflammations, which are ready to choak the Patient, a thing which does very frequently fall out; upon which account, every one concerned ought for the Future, to think of ſuch means for exciting Salivation, as may be gentle, and ſafe.

This did oblige me to apply my ſelf with all diligence and ſearch for another kind of preparation of Mercury, than what is to be found in Authors, by the means of which I can excite a Salivation, by giving, at the moſt, half a Dram thereof, to the ſtrongeſt Perſon, in four or five Doſes, which will alſo Purge by Stool, and a little by Vomit, Urine and Tranſpiration; and will give Motion enough to the Phlegm to paſs by the Mouth for as long a time, as when Salivation is excited by Friction, but in a manner that is incomparably more gentle, all the trouble which enſues upon Friction, being thereby avoided, which to ſpeak the truth, is ſo great and intollerable (beſides the danger to which the Sick is expoſed) that if thoſe who have the Venereal Diſtemper knew the ſame, I am verily perſwaded, that there is not one of them amongſt a Hundred, but would rather chooſe to endure the Diſeaſe all his Life-time, though it ſhould be never ſo ſhort, than meddle with ſuch a miſchievous Remedy.

That I may make it appear how intollerable that Method is, I ſhall ſhew in what manner thoſe that have the Pox are commonly treated when they are to undergo Salivation by way of an Unguent.

I ſuppoſe that the Patient hath no other Diſeaſe in complication with the Pox, which would require diſtinct Remedies, that ought to be firſt given, and that the Venereal Diſtemper is only to come under Conſideration.

I do likewiſe ſuppoſe that the Perſon that is to undergo the Friction is of a good and ſtrong Habit of Body, to engage with the Remedy, without any great Preparation for the correcting of the evil Qualities that are predominant in his Blood.

Now the Patient is to be prepared, *Firſt* they give him a Gliſter to diſpoſe him for Bleeding; the next day they let him Blood, and afterwards repeat Bleeding, according as the Patient is more or leſs Sanguine or Plethorick. They purge him at leaſt, three or four times, for carrying off the more groſs Excrements; and after that, they bathe him for eight or ten Days, to make the humours Fluid, to open the Pores of the habitude of the Body, and to make the Mercury paſs more eaſily through the Skin. Some, for the better opening of the Pores, give a Sudorifick, putting them three or four times in a Sweat, placing the Patient under a Canopy, Archet, or any other Inſtrument proper for that purpoſe: And in the mean time, they give him a Ptiſan to drink, to cauſe Heat and put the Humours in Motion, and withal diminiſh his Diet gradually, till he be wholly reduced to Broths.

After that, they begin Friction, with the Mercurial Unguent, which they have prepared before: This Unguent is ordinarily prepared to this form, or ſome other that may be reduced hereunto, by putting more or leſs Mercury in it. Take ſix Ounces

Quic

Quick-ſilver, beat it in a Marble Mortar, with it's cover of Wood, with three or four Ounces of fine Turpentine, when the Mercury is extinguiſhed, add thereto a Pound and a half of Hoggs-lard, and one Ounce of the Oil of Laurel; the Unguent muſt be beaten a long time, for dividing the Mercury, the beating being to laſt for the ſpace of ſeven or eight Hours, this is called the Gray, or Neapolitan Unguent, which is the ſame that the Apothecaries ſell for the Scab, with this Difference, that the latter has a leſs mixture of Mercury.

This Unguent is then taken, and after having made a great Fire, with a Screen before it, they make the Patient warm himſelf in his Shirt, that the Unguent may make a farther entrance, and they rub it on him, for that time, very well, from the Soles of his Feet to above his Knees, and from the Wriſts, to his Shoulders, uſing in this Friction, two or three Ounces of Unguent; after that, they put the Patient in a Bed very warm, obliging him to keep very cloſe and covered, having, before that, ſo order'd the Bed and all the Room, that the Air is ſhut out, and the wind can have no entrance, keeping a good Fire on, by Night and by Day, even when the weather is but moderately Cold.

The next day following, they put the Patient in the ſame Poſture, and making uſe of a little more of the Unguent, they rub all his Body (the Head, the fore-part of the Breaſt and Belly being only excepted;) and afterwards commit him to his Bed warm as before.

On the third day, they repeat the ſame, and if they do not perceive the marks of an approaching Salivation, they continue the like Method, by a fourth, a fifth, and a ſixth Friction, if after all, the Signs of Salivation do not appear, they think it the beſt way (inſtead of uſing more Frictions which may prove mortal) to give the Perſon, a ſmall Doſe of *Mercurius Dulcis* by the Mouth, to determin or begin the Salivation.

Then it is, that whilſt the Mercury, aſcends to the Head, the Patient finds pricking Pains in his Mouth, which are followed with Ulcers therein. And becauſe the Phlegm is ordinarily carried thither with a Rapid Motion, it does draw along with it ſelf the other Humours, which inflame all the Head and Throat, and put the Patient in danger of being Suffocated: Yet if the Salivary Veſſels be opened, and the Pituit ſufficiently Fluid, it does run ſwift enough, and two or three Pounds of the Saliva are every day evacuated at the Mouth.

This Salivation, that it may anſwer the Deſign, ought to continue at the leaſt for the ſpace of fifteen, and at the moſt, thirty Days; and during that time, the Patient is to eat nothing but Broth, ſome yelks of Eggs upon the Remiſſion, and a Ptiſan made with *Guaicum*, which is ſomething offenſive to the Taſte.

They give the Patient a Gliſter every other Day, and ſometimes purge him gently, eſpecially towards the end of the Salivation, which being over, they give him a formal Purge, they let him again Blood, and put him to Sweat, according as he is more or leſs dried by the Salivation.

To this it muſt be added, that the Patient is not to ſtir out of Bed, and that his Linnen muſt not be ſhifted for ſeven or eight Days, and that he muſt wear the ſame Shirt that he had on when the Friction was begun, which would be no matter of great hardſhip for ſome old Soldier, who might poſſibly wear a dirty and louſie one much longer time; but for thoſe Gallants who pretend to neatneſs, I verily believe, that they need no other Article of Penance *from the moſt rigid Confeſſor.*

What has been ſaid of this Matter, is ſuppoſed to be in a Man's Caſe; for, as to the Female Sex, if their monthly Courſes do not proceed regularly, proper means are to be uſed to regulate them, before the Remedy be applied, and if the Woman be with Child, there are Meaſures to be taken, with regard to all Particulars.

I alſo ſuppoſed, that the Perſons who receive the Friction, are of a good Habit and eaſie to be cured; for ſeeing by this Method, the Mercury has entred into the Body without any Proportion, and that this entrance does depend upon the diſpoſition of the Pores of the Skin; it does frequently happen that thoſe Pores are very much ſhut, and that

only a very ſmall quantity of Mercury does enter, which not being capable to diſſolve the Phlegm, which is over all the Body, does ſtill leave ſome Venereal Ferments behind, upon which occaſion the Pox does quickly appear again. And when the Pores are too large, a great deal of Mercury gets an entrance, which does attenuate the Phlegm with too great Celerity, and draws it to the Head, and to the Salivary Veſſels, with the other Humours, whence not only a danger of Suffocation does enſue, as we have ſaid, but alſo this precipitated Motion does hinder the equal diſtribution of the Mercury, through all the Body, and the reſolution of the coagulated Humours, which the Mercury would otherwiſe perform therein; ſo that in this caſe there can be no Cure any more expected; it is ſo far true, that a great or ſmall quantity of Mercury does ſignifie nothing in this Method; and nevertheleſs, it does not depend on him who does manage the Friction, to make it enter more or leſs, as we have ſaid, but wholly on the Diſpoſition of the Pores; whence we may draw this Conſequence, that thoſe who undergo a Method of Cure by the Unguent, are not reſtored but by Accident, and that they are more obliged to their good Conſtitution than to the Phyſician who preſcribes the Medicine.

That will not happen, if Salivation be excited by taking Mercury at the Mouth, becauſe in this caſe it may be entertained as long as it is thought neceſſary, and alſo augmented, when we perceive that it is not copious enough.

This way of Salivation is not dangerous, becauſe it is excited by little and little. It is more gentle, becauſe there is one part of the Matter diſcharged, which the Mercury does evacuate by Stool, Vomiting, Urine, and Tranſpiration. It is not troubleſome, there being no need for all that dolorous Fatigue, to which the Patient is expoſed by means of the Unguent, and by this Method, he may get out of his Bed when he pleaſes. It is ſhort, becauſe this Remedy is given to all, and the time from the giving of the Mercury, to the appearing of the Salivation, being ordinarily but ſix or ſeven Hours, is ſufficient to prepare the Patient, if need be; and this Preparation is only ſome Bleeding, which is done to thoſe who ſtand in need of it, and ſome Broth made of Herbs, to thoſe who are of a hot Diſpoſition of Body; the Salivation being once over, there is a purge given with ſome Royal Ptiſan, and the Work is done.

It is true, that when the Skin has been infected, ſome gentle Sudorifick may be given by way of Precaution, *viz.* a Glaſs of the Water of *Carduus Benedictus*, with a little Cinnamon Water, and ſome drops of the volatile Spirit of *Sal Armoniack*, to be drank every Morning, for three or four days together; which is an admirable Remedy for procuring Sweat without any Trouble, in a manner that is the moſt gentle that can be imagined. If it be adviſable to ſweat more copiouſly, there may be ſix Grains of the Volatile Salt of Vipers added thereunto.

This Method of procuring a Salivation by Mercury taken at the Mouth, is not unknown to able Men. It is alſo practiſed in Places of greateſt Renown. Some make uſe of crude Mercury, which is extreamly dangerous, for Reaſons mentioned elſewhere; others, white Precipitate, which I do not believe to be without Danger, becauſe it is prepared with *Aqua Fortis*, the ſalt Spirits of which do unite themſelves ſo ſtrongly to the Mercury, that they cannot by any Means be again ſeparated, though it may be ſweetned with waſhing, and the Spirit of Wine, and may be alſo prepared without *Aqua Fortis*; but ſince I have not ſeen theſe Medicines tried, and have great Cauſe to ſuſpect them, I will not determine any thing concerning them.

I only know, that *Mercurius Dulcis* ſublimate, which ſome uſe, is not in the leaſt dangerous, by reaſon of its Preparation which Experience has confirmed to be very good: But ſeeing it is neceſſary that a great Quantity thereof be given to each Patient, there having been one Perſon that had the Venereal Diſtemper in the firſt Degree, who took more than ſix hundred Grains before his Cure could be effected, I ſhall not make uſe of ſuch a Remedy ſo long as I can make a Salivation with Mercury that is more ſweet than that, and in ſo ſmall a Quantity, that the Work may

be very eaſily compleated, by taking fifteen, or twenty Grains, and at the moſt thirty for the moſt robuſt Perſons, in three or four Doſes.

To make it appear that the Thing is very eaſie, we muſt make the following Obſervations, which ſhall withal, moſt clearly contain all the Proceſs that I uſe in my Way of preparing Mercury.

Firſt, To proceed upon ſure Grounds, we muſt baniſh every Thing that is ſharp, for the Mercury does find enough of that in the Bodies of thoſe who have the Venereal Diſtemper; there is alſo enough in all Bodies, which joins with it, and gives it Force enough to open the Salivary Veſſels.

Secondly, Seeing Mercury is a great Enemy to the Brain, and to the nervous Parts, when it is crude or ill prepared, it muſt not be given Crude, nay, not with a Purgative, which ſends it off by Stool, for this is not the way to procure a Salivation, becauſe it cannot be doubted but that there is a way to prepare it ſo, as it ſhall not be dangerous, as we ſee for Example, in *Mercurius Dulcis*, which is known by Experience to be a harmleſs Remedy.

Thirdly, That in what manner ſoever Mercury be prepared, it cannot never be ſo diveſted of its own Nature, but that it will always keep a Character of its firſt Form, which it can eaſily reſume in all the ordinary Preparations, and that it is good to divert it as much as poſſible, at leaſt, as much as is neceſſary, that the Mercury may not be received in the Body.

Fourthly, That for this reaſon, the Mercury muſt be given in as ſmall a quantity as poſſible, and it is to be obſerved, that when Salivation is allowable, as it is in Perſons of a good Conſtitution, there does very little Mercury enter into the Body, although the Unguent does contain much of it; and it is ſo far thus to be preſumed, that there are ſome judicious Perſons who have maintained an Opinion, that in this caſe, nothing but the ſingle Vapour of the Mercury does enter into the Body, and if one had the Curioſity to gather the Mercury that remains in the Linnen, there would be the ſame Weight found, that was put in the Unguent at the firſt.

Fifthly, That although the Mercury be made fit to go to the Head, and raiſe a Salivation; yet this Salivation ſhall do no good, if it be not performed by ſuch a Motion as is called Critical; that is to ſay, that the Venereal Matter muſt be ſeparated from the Maſs of Blood, that it muſt be conveighed out of the Body by the moſt convenient Paſſages, which will not happen, if the Mercury be not a double Mercury, which may exert its Activity from all Quarters, and be diſtributed through the whole Body, in conformity to the Motion of the Blood, that it may be in a Capacity to ſeize upon the Venereal Ferment in all the parts of the Body; and therefore we muſt think it to be much better, if we could join it inſeparably by way of Fermentation, to ſome domeſtick Spirit, that is well acquainted with the Affairs of the Houſe, to conduct it through all thoſe Stages.

Sixthly, When this is once effectually performed, we ſhall only have a Medicine which will be more proper for Tranſpiration than for Salivation: And therefore there muſt be an Aſſiſtant that is no Stranger to this Kind, which muſt be made fit to produce all theſe neceſſary Motions.

Ignorant Perſons may imagine that I talk to be ſeen, and not to be underſtood; but Men of Reaſon, who by Study and Induſtry, do in ſome meaſure know the Nature of the Subject about which I Treat, will underſtand me at the firſt Reading, and do me the Right to declare in my Favour, that it is not poſſible for me to explain more clearly and faithfully, the preparation of a Medicine of this Importance.

And for ſuch Perſons it is, that I have written this Treatiſe; 'tis juſt, that they receive the Benefit of it, and that, in the meantime will invite others, by their Example to Induſtry and Study. *Qui nucleum ex nuce vult excorticat nucem*, i. e. He that would have the Kernel muſt crack the Shell. I further declare, that neither Ambition nor

Cove-

Covetouſneſs moved me hereunto. What I offer has a Foundation in Reaſon, which aſſiſted me in the finding of it, and this Reaſon is ſeconded by a very fortunate Experience.

By this means we may cure the moſt inveterate Pox; I have already excepted that Degree of it, where there is a Caries of the Bones of the Noſe or Skull. Yet we may reaſonably think it ſufficient. Nevertheleſs, from the time that I firſt diſcovered this Anti-venereal Medicine, although I have cured a great number of thoſe who had the Venereal Diſtemper, I have not yet had enough of ſuch Perſons, who had their Bones ſo very much Putrified, as to afford me an Occaſion of eſtabliſhing by Experience, an abſolute Aſſurance of the Thing. No body, in theſe Days, does ſuffer, himſelf to be eaten to the Bones by the Venereal Diſtemper, they look to it, in ſome reaſonable time, without expoſing themſelves to the Fatality of the laſt Degree, but becauſe I have formerly ſeen many, even of this ſort, who could not be cured, either by Mercurial Pills or Friction, which were given them with no ſmall Rigour; I have, with good Succeſs, uſed on the like Occaſions, a Fumigation or Vapour, with Turpentine or Balſam of *Peru*, the Cruſt of Bread in Powder, and a little Mercury, and thereby raiſed a happy Salivation, proceeding gently at the firſt. Yet this Method is not abſolutely without Danger, although Mr. *Sylvius de Leboe* has ſaid of it, that the Fumigation is the ſafeſt Way; it is eaſie, by making the leaſt Obſervation, to be of a contrary Mind, and I ſhall demonſtratively prove, that this Remedy cannot cure all ſorts of Pox, and if another way can be found for curing the Caries of the Bones, I would not adviſe any one to uſe this; but ſeeing this Method is not uſed in this Country, and there are very few who know how to practiſe it, I ſhall no longer inſiſt on it.

I do not here preſcribe any particular Method for Infants, becauſe I know they may be very well cured without Salivation, by the only uſe of Sublimate, or in all Caſes, by that of the Golden Precipitate.

Neither do I particularly conſider as yet, the Caſe of Women, who have irregular Courſes, becauſe we know by Experience that the Remedy I have given does infallibly provoke the *Menſtrua*, and that it does not in the leaſt divert Salivation: We have alſo obſerved, that the ſame Remedy does provoke the Hæmorrhoids in Men, who are ſubject to them, without diverting Salivation.

And upon this Account, it ought not to be given to Women with Child, for fear of an Abortion; but the Solar Precipitate is to be uſed, and that with great Moderation and Prudence, and in caſe the Cure cannot be compleated before ſhe is brought to Bed by reaſon of her being near her Time, which will hinder the Continuance of the Remedy it may be conveniently done afterwards, and in giving it to the Mother, the Child will be cured at the ſame time, if ſome Grains of the Volatile Salt of Vipers be given to it from time to time. Or the Mother may be ſalivated in that Caſe, if the Phyſician pleaſes.

There is no need of a ſeparate Chapter for a Deſcription of the Medicines that may correct the ill Accidents that frequently follow upon Salivation, that is made by the mercurial Unguent which, to ſpeak the Truth, are ſo Dreadful, that they are enough to ſtrike us with Horror, when we read them in Authors. You may judge how intolerable they are to the Patients, and what Tragedy they are to the Spectators: For if the Medicine be well ordered, there will no Accident enſue, there needs only a common Gargariſm to qualifie the Ulcers of the Mouth, yet this is not to uſed too often unleſs there be an Hæmorrhagy, leſt the Ulcers be cloſed up too ſoon, and ſo the Salivation have not a due time for its Continuance, which ordinarily, is at the leaſt fifteen, ſixteen, or twenty Days, or at moſt thirty Days, which happens very ſeldom, unleſs when it is thought neceſſary to be entertained ſo long.

Of the Chancre.

I ſpeak not here of Chancres that are Accidents of the Venereal Diſtemper, becauſe theſe are cured by the ſame Remedy that is proper for the Pox, but only of those that are the particular Pox, the Ferment

hich has not been carried farther than the
rt which at first received it; and whereof
e have spoken sufficiently in the preceding
hapters, with respect to the Theory; so that
is needless to repeat the same Thing. As
r the Practice, I differ somewhat from
me Authors whom I have seen, not from
Spirit of Contradiction towards any Per-
n, but becaufe I learned by Reason and
xperience, that this sort of Chancres may
more successfully and easily Cured, other-
ise than by the ordinary Methods.

They alledge that all Chancres of the right
rt, ought to be Cauterised, and then
ought to Suppuration; and for this pur-
se, they make use of Red Precipitate, of
apis Infernalis, or the common Caustick,
Sublimate Corrosive, and they cicatrize
e Chancre with a Suppurative, after that
ey use the ordinary Remedies, and in the
an time they Purge the Patient frequent-
with Mercury, for the depuration of his
lood, because they suppose, that it would
very extraordinary for the Chancre to re-
ain in a Part, for any long time, without
nsmitting insensibly some Particles of the
nereal Ferment into the Mass of Blood,
hich may produce the Universal Pox, if
be neglected, and besides that, those who
the greatest Precaution, give Diaphore-
ks to the Patient, after those Remedies.
l this is attended with an insupportable
in, and unspeakable trouble to the Per-
n, besides the unreasonable time which it
quires. I am confident, that if *Vigo*'s Plai-
r, with a little *Mercurius Præcipitatus*
lcis be applied to the Patient, and if some
ses of the Solar Precipitate be given to
n; the most inveterate Chancre shall be
ly Cured without Pain, without Trou-
, and in a little Time.

f there be a *Phymosis*, or a *Paraphymosis*,
at is to say, the former, when the Glans
o enclosed within the Prepuce, that it
not be uncovered, or the latter, when it
o uncovered that it cannot be again co-
ed) but the latter, especially, being at-
ded with an Inflammation and a Pain;
same Solar Precipitate, after once Bleed-
is an effectual Remedy.

Of the Heat of Urine and the Virulent Gonorrhæa.

It would require a Book by it self to treat of this kind of Pox exactly; yet all sorts of Persons meddle with it, and there are those who pretend that they can easily Cure it with Water and Sugar; others with a bare Royal Ptisan, which is to be taken every Day, till the Cure be Compleated; a third sort, with the Salt Polychrest or Chrystal Mineral; in a Word, every one does flatter himself with the Fancy that he has found an excellent and easie Method for curing this Disease.

Yet they who are most Conversant about those things, and who are to be Credited, are obliged to acknowledge, that if there are sometimes Heats of Urine that may be easily Cured, there is also a great number of others which are hard enough to be Cured; and that oftentimes the great Disease might be more easily Cured than any Venereal Heat of Urine whatsoever, especially, if it be not well look'd to at the beginning, and if the specifick Remedies be neglected, or ill administred.

I have seen no approved Treatise of this Subject, but what does give Rules that are to be observed, for a good Cure. And therefore, I shall not here particularly treat of them. Yet I hope, within some time, to give some singular Observations upon this Subject, which I would have willingly done in this Impression, if they had been ready for a Publication.

Yet that this Treatise may not be altogether Defective, I shall here lay down a Method of Practice for ordinary Occasions.

I do not repeat what I have said in the fourth Chapter, touching the Theory of this Particular Pox: For although I did not very much enlarge upon it, you may there find that which is necessary for the Knowledge of it's Nature, and the manner of it's Production.

First, If the Person be of a very hot Temper, and Plethorick, and the Pain, and heat of Urine considerable, there is no danger in Bleeding him, and repeating it as often as it shall be thought Necessary; the Blood must

be

be taken in the Arm, to make a true Revulsion, and not in the Foot, which would draw the Humours more upon the Part.

They were formerly very scrupulous to let Blood, and especially, in the Arm, because they believed, that that might attract the Virulency into the Mass of Blood, and thereby occasion the Great Pox, but they were undeceived, after they saw both Reason and Experience do manifestly justifie Phlebotomy. The circulation of the Blood does plainly shew, that if there were any danger in letting of Blood, the practice would be as dangerous in the Foot as in the Arm; and experience shews, that bleeding in the Arm does so much contribute to the Cure, that it is the means of preventing the Pox, because it cools and suppresses the Inflammation, and thereby hinders the progress of the Venereal Ferment, it disburdens the Sanguinary Vessels, and so makes way for Purgatives and Diureticks to operate with tients the greater Efficacy.

Yet I do not alledge, that all sorts of Pa ought to bleed, but only those who are Hot, Sanguine and Plethorick.

I Advise withal that the Virulency be not Neglected, and that the specifick Remedy, which is *Mercurius Dulcis*, be not forgotten, which is sufficient for this Disease, if it be given with convenient Purgatives, as *Cassia*, fine *Catholicon*, or Confection of Hamech, and repeated from time to time, as necessity shall require.

Nevertheless this Remedy will be ineffectual, or very slow on some Occasions, as when the hot Urine is Roapy, which happens when the Inflammation is very great, and the Patient suffers great Pains, that cause a Convulsion in the Nerves of the Yard, which by dilating themselves in their Breadth, do retire toward their Original, and so make the Yard Crooked or Twisted; in this case it will be found, that one Dose of the Solar Precipitate seasonably given, will be a very safe and effectual Expedient.

In the mean time, care is to be taken, that the Patient may be Cooled, which is one of the first things to be done, and 'tis to be remembred, that if he be heated from the beginning, by a Purgative, the Malady becomes thereby very Rebellious, and the Symptoms are exceedingly encreased; or t virulent Matter shall be thrown upon Stones: Emulsions are the best means th can be used for cooling, after which, if be thought Convenient, there may be giv some very cooling Ptisan for Example, whole Barley, the Roots of Water-lil Sorrel, Marsh-mallows, and of Liquori Linseed, the cold Seeds, white Poppy Se and some Lemmon Juice, all boiled tog ther in a proportionable quantity of Wat which must be always a great deal, becau the Patient must drink as much of the Pti as his Stomach can bear.

When the accidents disappear, so that virulency is mitigated by the means of *M curius Dulcis*, that the running is not great, and becomes pretty White, if an U cer be thought to be in those Parts that the Seat of the *Gonorrhœa*, there must be in the Ptisan a little of the Salt of Polych or Crystal Mineral, or which is much ter, the fixed Salt Armoniac, which is a tle and powerful Diuretick for clean Ulcers, after which, to consolidate the Pa there must be given, for some Mornings, i little Wine, twelve or fifteen drops of am ture made by Distillation, of two parts of Balsam of Peru, one part of the Ethereal S rit of Turpentine. Or, This following prep ration of Antimony may be used, which a good Remedy for drying an Ulcer; it st the running of Matter, gently and insen bly, and also expels the remainder of the rulent Matter, by Sweat, when it has been sufficiently taken off by preceding M dicines.

Take equal parts of good Antimony, a of Harts-horn calcined to a Whiteness, m these two substances very well upon M ble, put the mixture in an open Earth Vessel, set it in a Wind-Furnace, you sh calcine them, by stirring the Matter con nually with an Iron Spatula, till the Sm thereof be well over; after which the wh is to be put into a Crucible, with a la Bottom; calcine them therein over a g Fire, for the space of two Hours; you sh have a Powder, white as Snow, and wh for some great and peculiar Advantages preferable to the vulgar Diaporetick A mony; which will be manifest by Exp en

nce: The Doſe is half a Dram, with the onſerve of Roſes, or any other Conſerve, r Water of the like Nature, as you pleaſe.

No injections are to be uſed, if they may e avoided, but ſometimes we are at laſt o-liged to uſe them, and that we may have ne that is proper and ſafe, this is to be made uſe of.

Take a Handful of Horſe-tail, as much of ed Roſes, and five or ſix Flowers of a Pome-granate, or their peeling in Proportion. Let ll be boiled in three Pints of Claret, Wine f a good Body, to the diminution of the Half, then ſtrain it through a Linnen-cloath o free it from the groſſer Parts, and make n injection with it three or four times a Day.

All theſe Remedies will be unprofitable, f the Patient does not obſerve good Rules or governing himſelf, he muſt be Conti-nent, uſe no violent Exerciſe (eſpecially what may prove troubleſome to the Reins, uch as much Walking, Riding) avoid Drinking of Wine, Sauces, Play, Watch-ng, and the like.

Of a Bubo or Poulain.

The manner how a Venereal Bubo or Pou-lain is produced, has been ſpoken of in the fourth Chapter, we need only add here, that ſeeing the Poulain is produced in a critical manner, it is not to be imagined, that it is a perfect Criſis; and when ſuch a Tumour does appear in the Groin, which makes a Poulain, although the Venereal Matter of that Poulain has been ſeparated from the Maſs of Blood, and the Blood is entirely cleanſed from it, yet there does always re-main a great deal more, and even when the Poulain does ſuppurate very well, there is ſome time required, before the Maſs of Blood can be freed; and poſſibly this will never happen, unleſs there be great care taken, both to draw forth the Matter by external Remedies, as by Cupping-Glaſſes, and Ve-icatory Plaiſters, and likewiſe to give fre-quent and ſtrong Purges by Specificks; be-ſides a Sudorifick Diet, which ſome Pre-ſcribe, the better to conſume the Venereal Ferment, with which the whole Blood is infected.

And upon this account we ought to look upon this ſort of Pox, not as particular, but Univerſal, becauſe the Virulency there-of does reſide in, and it is upon this ground, that I am of Opinion, that it does require the ſame Remedy. I further affirm, that by that means, it ſhall not only be cu-red with all imaginable Aſſurance, but like-wiſe in a much leſs time, then according to ordinary Method.

To underſtand this well, we need only obſerve, that two or three Months time is oftentimes requiſite for perfecting the Cure of a Poulain. When it begins to appear, they apply Cupping-Glaſſes to it, to draw the Matter outwards, and ſtay it in that Part, which puts the Patient to a great deal of Pain; after which, they apply very attra-ctive Plaiſters or Cataplaſms, and very fre-quently it is a Month before that Bubo come to a State of Suppuration, eſpecially in thoſe who are of a cold and melancholy Temper; for in thoſe that are Sanguine it does ſup-purate more eaſily: When the purulent Matter is of ſome Maturity, they open the Bubo with a Launce or Cauter, and dreſs it as they do other Tumours, till the Sup-puration be over, which is of a very long Continuance: In the mean time they purge the Patient frequently with Mercurial Pills they confine him to a Diet-drink and after all, there are ſome who make him Sweat a little, or empty him by Diureticks.

If the Solar Precipitate be uſed every third Day, and *Vigo*'s Plaiſter with Mercury, be applyed to the Bubo; Poulains ſhall be cu-red without Danger, if what we ſaid in the eighth Chapter be obſerved, where we ſpoke of the Golden Precipitate.

By this Method you will find that Pou-lains are reſolved, and the conſequences are not to be feared, becauſe, according to the Precautions that we have laid down, the Blood is ſo well depurated, that there re-mains no Venereal Ferment; and no Man can upon any good ground oppoſe this Me-thod, becauſe, it may be often obſerved, that Poulains do diſappear, (what ever may be pretended) after all kinds of Suppuratives have been eſſay'd, and the Patient has en-dured a long Fatigue. And therefore, there is a neceſſity, to uſe the ſame Methods as in

the great Diſtemper, or, if it be not done in that time, thoſe who differ from me, are conſtrained to uſe this way, when they ſee the ordinary ſigns of the Pox appear. Thoſe who have Poulains, know very well that what I ſay, is true, and if they would be at the Pains to reflect on their own Method; if they would take a view of the Sick whom they have not recovered, or have cruelly Tortured, and if they were diſpoſed to quit the Prejudices with which they are Blinded, they would quickly embrace what I propoſe, ſeeing it is a more certain, gentle and ſhort way.

But if a Poulain comes to ſuppurate of it ſelf; it would, in this caſe be very Fooliſh, to drive the Venereal Matter into the Body, to evacuate it by Stool, or any other way than by the Part it ſelf; which ought to be Cauterized or Launced, without expecting any thing but the Maturation of the Abſceſs it ſelf. The Matter muſt be let alone, to run ſo long as it can of it ſelf, by keeping in the Paſſage a Tent of Lint only, and the like upon the Plaiſter which we have mentioned, and in the mean time, the other Remedies, of which we have ſpoken are to be given, as if the Bubo had not been opened.

I declare, it is very much to be wiſhed that Buboes did ſuppurate of themſelves, and alſo, that if inſtead of the drawing Plaiſter, the Matter could be ſo ordered that all the Venereal Matter, with which the Maſs of Blood is Infected, might be evacuated through the Paſſage that is made after Suppuration; the Sick would receive ſome Comfort, under the extraordinary Pain which they ſuffer, and the wearifom time that is taken for the Cure: But to ſuffer much, to be Patient beyond Patience, and to take an extraordinary number of troubleſome Medicines, all this, I ſay, is ſufficient to open the Eyes of thoſe who are moſt Stupid, and oblige them to conſider what I propoſe to them.

I know very well, that it is a matter of ſome Difficulty, for thoſe who have been prevented with a contrary Method, to accommodate themſelves to this: Reaſon, how Pregnant ſoever it may be in it ſelf, has ordinarily no power over thoſe who are no in a Condition to uſe it themſelves, or (if they be) are engaged by their Intereſt, no to change; the continuance of the Diſeaſe a great number of Cataplaſms, Pills, Ptiſan maintain the Trade of not a few in th World, and are valuable enough to pur chaſe ſome Lucre, which is fairly advance by the Pains that the Sick endure, who b ing ignorant of the Nature of the Diſeaſ do never think it great but when the Pai is great, and when the cure takes a lon time: Nevertheleſs, becauſe there are ſom able Men in all Places, who hearken to Re ſon, and who are ſo laudably diſpoſed, th they ſuffer themſelves to be convinced, hope, that there may be ſome one of ſuc found, who will grant me one thing leaſt, which is to examine impartially wh I offer; and when he ſhall find what I a firm is not contrary to Reaſon; it muſt a ſo be enquired, if experience does agree wi Reaſon; by this means he will judge righ ly, and if there be any cauſe for it, he m give me the Lye, but I have no reaſon be affraid of the Charge, becauſe, befor offered any thing to the World, I did th things, I reaſon'd, I practis'd, and frequen ly reflected on my own Experience.

Of the Gonorrhœa *both in Men and Women: From* Michael Torres, Drake, *&c.*

Of a Gonorrhœa *in General, both Virulent and Simple in Men.*

I Shall ſpeak of each of theſe *Gonorrhœa's* apart, and firſt of the Virulent one, which is a malignant Diſtemper, communicated, or a Contagion gotten by Coition, with an impure Companion, and is widely different from a Simple *Gonorrhœa*, as I ſhall ſhew by and by. When a Man has gotten a *Gonorrhœa* or *Clap* it increaſes in ſtrength continually, and each Days neglect gives the Malignity Opportunity of exerting and ſpreading it's ſelf, till the Diſeaſe from a particular one hath proceeded to infect the whole Maſs of Blood, and becomes Univerſal. The Symptoms of a Venereal *Gonorrhœa* are a painful heat in making Water, which by the *French* is call'd *Chaude Piſſe*, and which they diſtinguiſh as a particnlar *Gonorrhœa*, yet is only a Symptom of a Venereal one, as are alſo the involuntary and painful Erections, and a running of a corroſive Matter of a greeniſh Colour, with often an Inflammation of the Yard, which makes the Patient look Megre and Thin, alſo a ſmall Itching at the beginning of the *Glans* or Head of the Penis juſt at the entrance of the *Urethra*, or Paſſage of Urine, which continues before any thing elſe appears, ſometimes one, two or three Days, after which a Running ſhews it ſelf as aboveſaid, either Yellow or Greeniſh, and the Urine ſeems Hot and Pricking, which increaſes till the Patient ſeems to have a Strangury, which prompts him to the act of Copulation, when the Acrimony of this Malignity is increaſed, and the *Ulcer* formed, he is ſcarce warm in his Bed before he hath an involuntary Erection, and that very Painful, being what the *French* call a *Chordee*, becauſe the head of the *Penis* ſtands Bent, and ſeems as if it was drawn downwards by a Cord or String. The Teſticles are likewiſe ſometimes very much ſwell'd, and that either by the Miſapplication of thoſe, who have the Patient in Hand, or by ſome violent Exerciſes, as Riding too much, Jumping or the like; ſometimes alſo *Buboes* ariſe in one or both *Groins*, by the Matter which Runs, being propelled into the *Glands* there, likewiſe ſometimes there happens a *Phymoſis*, when a Man is *Clap'd*, which is ſuch a Contraction of the Præputium or Fore-skin, that the Nut is ſtrangulated, the Contraction being ſometimes ſo very much ſtraitned and wrenched up behind the Ring of the Nutt, as to cauſe it to ſwell, ſo that it cannot be brought over to cover the *Glans* or *Nutt*, and ſometimes there is a *Paraphymoſis*, which is the reverſe of the Former, and is ſuch a ſtraitneſs over all the *Glans* or *Nutt*, as that the *Præputium* cannot be ſlip'd back to uncover the *Nutt*, nay ſometimes not to be extended ſo much as to ſhow the very end of the Nutt, or entrance into the *Urethra*, or Paſſage of Urine, and his ſhutting up or incloſing of the Nutt, keeps in the Acrimonious Humour between them, which *Corrodes* both Præpuce and *Glans*, and cauſes Pain, Inflammation, Fluxion, and perhaps *Gangrene*, which oftentimes alſo are the Conſequences of a *Phymoſis*. Thus having ſpoken as much concerning a virulent *Gonorrhœa* or *Clap*, as is neceſſary for any Man to know whether he has ſuch an accident or not, I ſhall proceed to ſay ſomething of that which we call a *Simple Gonorrhœa*, that none may be impoſed upon by any Mercenary Practitioner, to the Detriment of their Health, who may with deſign tell them it is one when it is the other.

A *Simple Gonorrhœa* then; is an involuntary Effuſion of Seed only, either *Crude* or well Digeſted, proceeding from a Relaxation of the Seminal Veſſels, either by means of a ſuper-abundant quantity of Seed, and that Hot and Acrimonious, or through the Weakneſs or ill Conſtitution of the Patient, or through ſome external Accident, as Bruiſes on the Privities, Wrenches, Strains, carrying heavy Burdens, or the like; appearing quite different to the Venereal Symptoms aforementioned, and is to be cured by the Exhibition only of the moderate aſtringent corroborative Remedies, though too often this and the Malignant one are confounded, and cures alike attempted by the Ignorant, I knew a Young Man, who upon ſtepping over the ſide of one Ship to another, in order to be ſet Aſhore, by the Motion of the Ship ſtep'd ſo far, that he felt Aſtride, on the ſide or edge of the Ship, and greatly bruiſed himſelf on the Teſticles and Perineum, upon which great Pain and Inflammation enſued, which brought on heat of Urine, pain upon Erection, and a whit after a Running at the *Penis*, appeared as if he had been *Clap'd*; a Surgeon being ſent for, made ſuch Applications as he conceived neceſſary, but when he ſaw the Running and had had complaints repeated of heat o Urine, *&c.* He taxed him with being *Clap'd* which though the Young Man denied, ye the Surgeon would not believe, but treate him as ſuch, to almoſt his inevitable Ruin had not his Friends ſent for another, who upon mild attemperating and aſtringent Me dicines recover'd him,

Of a Gonorrhœa *in General both Virulent and Simple in Women, whi latter is called the Whites.*

WOMEN are ſubject alſo both to the Virulent and *Simple Gonorrhœa*, the latter of which is called the *Fluor Albus* or the matter of the virulent one, is like that in Men, and flows continually, and without Intermiſſion as theirs do, and is Yellowiſh or Greeniſh, Graveolent, Sharp and Corroſive, and is generally attended with little Ulcers on the Labia of the *Pudendum*; but theſe Symptoms alone are not always to be rely'd on, for there is beſides, this remarkable difference, which (if carefully heeded by thoſe that have any cauſe to ſuſpect themſelves,) will not deceive them, and that in the Virulent *Gonorrhœa* does not ceaſe running at the time they have the Menſes, when the *Fluor Albus* always ceaſes Running, and returns a little time after they are gone, Women who are *Clap'd*, are freed from ſeveral of thoſe Symptoms which attend Men, and by which chiefly we make our Judgment of the Diſeaſe, as particularly to the Urine, which in Women is not alter'd as it is in Men, neither does it ſeem to have more than the uſual Warmth, unleſs where the parts of the *Labia*, which the Urine wets in making, are Excoriated Exulcerated; the *Chordee* likewiſe, whic moſt Men that have a Virulent *Clap*, a vex'd with, are very ſeldom obſerved Women; indeed where the *Clap* is very V rulent, and has been neglected or ill trea ed, the *Clitoris* may be inflam'd and irrit ted ſo as to cauſe a diſtorted Erection, whi may be Painful; but that is a Symptom b ſeldom, the Womens Teſticles alſo, or t ther *Ovaria* lie, at too great a Diſtance be affected with Humours, as we frequen ly ſee in Men; but they are liable to a *P moſis*, but a *Paraphymoſis* entirely exempt from, the firſt being an Humour of the O fice of the Vagina obſtructing the Introd ction of the *Penis*, which if not rectify'd time, inflames, and Ulcers are form'd w a Defluxion of Humours on the Part, wh are dangerous if neglected.

It does not always follow that every W man that *Claps* a Man, is actually her *Clap'd*, becauſe it is poſſible that an infec Man may have left ſome of the Viru Matter in the Vagina of the Woman, wh being retain'd in it's wrinkles the next

gon

gorous Gallant, may be ſo kind to take it from her in the Act, to his own Detriment and her Eaſe, or at leaſtwiſe but part of it, and ſo they may be ſharers in the Infection, the poſſibility of being infected, not depending ſo much on the Quantity of the Malignant Matter inhibited, as on the Virulency or Corroſiveneſs of it. Hence I believe had that vulgar Error among Men, its riſe, who alledge that when a Man is *Clap'd*, he frees himſelf, or at leaſt leſſens his Malady, by immediately after, lying with a ſound Woman, and alſo an infected Woman with a ſound Man, when in reality every Venereal act increaſes the Diſtemper, nay every Erection, if we conſider the Seat of the Diſeaſe to be in the *Urethra*, as I ſhall by and by demonſtrate, aggravates the Malady, by diſtending the *Urethra*, and conſequently inlarging the Ulcer, whereby the Malignity the deeper inſinuates it ſelf; or if the Virulency be taken off, and what running remains be only from a Weakneſs of the Parts, thoſe Erections hinder it's healing by interrupting Nature, in filling up the Ulcer with ſound Fleſh, in order to be cicatriz'd by the Nutritious Juice ſent thither for that purpoſe.

The *Simple Gonorrhœa* in Women, or rather the *Fluor Albus*, or as vulgarly call'd the *Whites*, proceeds only as in Men, from a Weakneſs or Relaxation of thoſe *Glands*, which are deſign'd by Nature to ſeparate a Mucous Juice for the Lubrication of the *Vagina*, which the Ancients Erroneouſly call'd Seed. It is ſometimes thin and whitiſh like Whey, ſometimes of a pale Citron Colour, Gray, or Greeniſh, without any Smell, and is ſometimes ſo Acrid and Hot, (which makes many Women believe and will not be perſwaded, but it is Virulent) as to Corrode and Exulcerate the *Labia*, as they are bedew'd with it, and in ſome Women, cauſes ſuch a violent Itching, as not to be born without hard Rubbing or Scratching, and this is when the ſharp Humours of the whole Body are ſent down thither, as the common Sink, to be diſcharg'd, which then uſually colours the Running Blackiſh, and ſometimes Fœtid, which the more confirms them it is Malignant, as many have come to me, and would not be beat out of it, but it was ſo; one Lady that I cur'd but a few Months ſince was under the diſmal Apprehenſions of having the Venereal Diſtemper, becauſe of ſuch a Running, which at length ſhe was convinc'd to the contrary of, notwithſtanding ſhe had ſuch an intolerable Itching, and Soreneſs in the *Labia*, that ſhe could not reſt a Nights, with pain in the Back, Weakneſs and Laſſitude, by the ill Diſpoſition of her Body, and great Flux of the *Whites*, which if ſhe had been treated for, as what ſhe imagin'd it to be, it might as ſhe was a Fat Lady, and full of Humours, have coſt her Life.

Of the Seat of the Virulent and Simple Gonorrhœa *in Man.*

THERE are almoſt as many Opinions, as to the Seat of a *Clap*, in each Sex, as there are writers on the Diſeaſe, but to quote them all, would be to ſwell this ſmall Treatiſe to a great Volume, yet it is neceſſary to mention in general terms the Diſagreement, there is amongſt them as to this particular, becauſe ſome that practiſe may ſee the Reaſon of their unſucceſsfulneſs in ſuch Patients, and why it is that ſuch numbers of People are left with incurable *Gleets*, though under the care of otherwiſe ingenious Men, and indeed it is the greater boldneſs in thoſe (as there are many) who undertake Patients in this Kind, when they know no more of the Seat of the Malady, and conſequently can give no more Reaſon for what they adminiſter for Cure, than that they have ſeen and known ſome Methods uſed by others with Succeſs, when alas! Such have never made them acquainted how many they have diſappointed in their Cures, to one tollerably ſet to Rights.

Some

Some of the Ancients ſay, both Virulent and *Simple Gonorrhœa's* proceed only from a Corruption of Seminal Matter, and that the Seminal Veſſels are only affected. Others ſay that in a Venereal *Gonorrhœa*, the tone of the Teſticles is depraved, by which the Seed is Vitiated; and that when there follows a *Gleet* that is inveterate, the *Paraſtatæ* are ſometimes Ulcerated, or at leaſtwiſe greatly Debilitated. Others ſay that in a *Clap* the *Paraſtatæ* are Ulcerated and that what flows is Seed, together with the Virulent *Pus.* Others, and thoſe ſome of the lateſt, ſay, that all Runnings in Men have their Original from the *Proſtate Glands.* Others again ſay that the *Proſtate Glands*, Seminal Veſſels, and Teſticles, are all three alike concerned, and that from an imbecillity of thoſe ſeveral Parts, occaſioned from a Malignant Virus, the running is produced, which becomes Fœtid and Putryfy'd, thus *quot homines tot ſententiæ*, and thus do we ſee the endeavours of Men, ſome of which were great in their time, to fix the Seat of a Virulent *Gonorrhœa* on this or that Part or Parts, which in good truth have no relation hereunto, and conſequently no ways concern'd therein; where then will it be ask'd is the true Seat of a *Clap* in Men? In anſwer to which I affirm it to be in the *Urethra*, or Paſſage of Urine, not that it is confined to the very ſame part of it, but may be fixed ſometimes in one, and ſometimes in another part of that Membrane, it ſometimes, and to ſome People happens within an Inch or leſs of the Extremity of the Paſſage, at other times, and to other People, it may be in the middle of it, at other times at the further end, but never in the *Proſtate Glands*, Seminal Veſſels or *Paraſtatæ*, but to the contrary is found upon Diſſections to be as I ſaid before, but for the moſt part on the Mouths of the *Glandulæ Mucoſæ*, or near them in the *Urethra*, as ſome of our lateſt and beſt Anatomiſts confirm, and not on the Parts the Ancients, and ſome of the Moderns after them, imagine, convey'd thither by the penetration of the ſubtil *Virus*, through the Pores of the *Glans* or *Nut* of the *Penis* in the time of Copulation, which cannot be if the Nature of that Malignity, and texture of the Parts, through which they imagine it t paſs, be rightly underſtood, for there is n ſo much as one Vein to lead the Veno from the *Glans* to any of thoſe Parts, if the was, and that the poiſonous Humour cou paſs, the infection would not appear in *Gonorrhœa*, but in the Pox it ſelf, and aft ſuch a manner, would the Patient be infe ed in the beginning. And that this is ſo, demonſtrable by the *Glans* and *Prepuce*, b ing beſet with Shankers, or *Ulcuſcula*, we frequently ſee upon impure Copulatio when any of the Venereal Matter happe to fix on thoſe Parts, which do not affe the Blood, or ſo much as get into the *Ur thra*, to procure a Running, but there r main, and are eaſily to be removed, and t Patient at once Cured, without any inte nal Medicine, unleſs they be neglected not rightly manag'd, which then inſinua by degrees into the Pores of the Skin, a corrode by its ſharp Particles, the tend Fibrils of thoſe thin Membranes, but ev then do not paſs into the Blood-veſſels, t they have form'd a deep Ulcer, which th aſſuredly Poxes the Patient, ſo that if it ge next to the Blood-veſſels, to be whirl'd bout the Body, a Man can never be ſaid be Pox'd.

It is very Apparent, that the Seat of inv terate *Gleets*, is alſo from Venereal *Ulce* on the *Glands* in the *Urethra* not Cicatriz'd and the Reaſon that the common Metho of Cure, ſo often fruſtrate the Expectatio of both the Practitioner and the Patien But for the *Simple Gonorrhœa*, the Seat that as I ſaid before is in the Seminal Ve ſels, by means of their being relax'd by e ther a Flux of Acrimonious Humours upo them, or by Falls, Bruiſes, or the like which however, and *Gleets*, being confoun ed together as from one Cauſe, and ſeat in the ſame Place or Places, by Authors, the Reaſon why ſo many People are ruin by the Applications made, which inde are ſo prepoſterous as would make a M of any Underſtanding both admire a bluſh at.

But though the Malignity in *Claps* ent the *Urethra*, and there inſtantly fixes it ſ on the *Glandulæ Muſcoſæ* after the *Sem Humanum* is ejected through it; yet I ca

t but allow that by ſome extraordinary cidens the Virulent Matter, may fix it f on the Valves of the Caruncles, which placed at the opening of the Ducts the Proſtatæ; yet take this by the way, lo not allow that therefore it may be fix- in the Proſtatæ themſelves; no, for they ng at ſome diſtance from thoſe Caruncles, Malignant Humours muſt have form'd ery large *Ulcer*, before it come to them, d muſt have gotten into the Blood long fore, and by that Rule the moſt diſtant rts of the Body may be equally Infected; thoſe Valves, though they will ſuffer Liquor, which they ſeparate, to paſs rough them as Mercury or Quickſilver is ained through Leather, yet will they not mit any Liquor to paſs through thoſe bes into the Proſtatæ back again: Or ſup- ſing, as ſome will have it, that the Ma- nity in a *Clap* is fix'd at the Valves of the *ſiculæ Seminales* themſelves, till the Diſ- e hath proceeded firſt to a Pox, and theſe *ſiculæ Seminales* become infected *a Poſteri-*, which I grant may be, even to the Cor- ding and Ulcerating thoſe Valves quite , whence proceeds conſtant involuntary uſion of pure Seed, which brings on a rſal Tabes or Conſumption of the Back, hich cannot be cured but by Caſtration, d by that but ſeldom, and without never. r ſuppoſing as others Aſſert, that the Ma- gnity in a *Clap*, takes up its Reſiſtance in e *Paraſtatæ*; yet as they lie ſtill at a great- diſtance from the *Urethra*, than either e *Proſtatæ* or *Veſiculæ Seminales*, the Malig- ty to come at them, muſt not only paſs the *Urethra*, through the *Valves*, into e *Veſiculæ Seminales*, (which is directly ntrary to the action of thoſe *Valves*,) but muſt li ewiſe take a long courſe through em, and the *Vas differens*, before it can ſſibly come at the *Paraſtatæ*, and why ſhould ſo befriend the *proximate* Parts it ſſes through, to fix it ſelf on thoſe remote rts is a *Phænomena* I am not able to Solve. r ſuppoſing, as ſpoken before, that it is ſſible for the Virulent Humour to paſs rough the Pores of the *Glans*, or *Nut* of e *Penis*, in the time of *Copulation*; yet then e *Paraſtatæ* cannot be affected by it, till e whole Maſs of Blood is, and when that is Infected, the whole Body is ſo; but as I have already ſaid, there is not one *Vein* near the *Glans*, to convey it into the Blood; ſo no ſuch Infection can be.

To ſum up all then, it is I think made plain, that the Seat of a Venereal *Gonorrhœa* or Clap in Men, is not in any of thoſe parts aſſigned to it by the Antients, and ſome of the Moderns treading in their Steps, but in the *Urethra* or Paſſage of Urine, but that it may happen in any part of that, has been ſhewed, though it moſt commonly takes up its Reſidence, either in the *Oſtiola* of the *Glandulæ Mucoſæ* or ſomewhere near them, but ſtill in the *Urethra* or Paſſage of Urine. " Theſe *Glandulæ Mucoſæ* are call'd " ſo by the late Ingenious Mr. *William Cowper* the Surgeon, who firſt diſcover'd 'em, " and are more particularly ſpoken to, by " the Learned Doctor *Drake*, in his *Anthropologia Nova*, *Pag.* 262. 263. In theſe " Words; They are ſays he three in Number, the two firſt are about the bigneſs " of a *French-Bean*, of a depreſſed oval Figure, of a yellowiſh Colour like *Proſtates*, " and lie on each ſide of the *Bulb* of the " *cavernous* Body of the *Urethra* a little a- " bove it. Their *excretory Ducts* ſpring from " their internal Surface, next the inner " *Membrane* of the *Urethra*, whence deſcending about half and Inch, they be- " gin to grow leſs, and piercing that *Membrane obliquely*, open into the *Urethra* by " two diſtinct *Orifices*, juſt below its bend- " ing, under the *Oſſa Pubis* in *Perinæo*, " where they diſcharge a tranſparent *Viſcous* Liquor. The third *Mucous Gland* is " a ſmall conglobate yellowiſh *Gland* like " the former, but ſomewhat leſs, ſituated " about the *Angle* of *Flexure* of the *Urethra*, " under the *Oſſa Pubis* in the *Perinæum* near " the *Anus*; and hath two excretory *Ducts*, " which enter the *Uretha* obliquely, about " a quarter of an Inch below the *Orifices* of " the two former, and diſcharge a Liquor " like theirs, both in Colour and Conſiſt- " ence.

Thus from this faithful and ingenious *Anatomical* Diſcovery and Deſcription, and from what hath been ſaid, it is plain that the true Seat of a *Clap* is where I have ſaid,

and

and likewiſe as plain that when it firſt appears and for a conſiderable time after, it is purely *Local*, that the Blood is untainted, and not in the leaſt concern'd in it at that time, and that while it continues ſo, it may be heal'd as other common *Ulcers* are, by external Applications only, which I ſh further and yet more plainly make appe before I finiſh this Treatiſe, to the Satis ction of all People, but ſuch who reſo to ſhut their Eyes againſt the moſt conv cing demonſtrative Truths that are.

Of the Seat of the Virulent and Simple Gonorrhœa, *or* Whites *in Wome*

HAving ſpoken large enough, to give all an inſight into the Seat of a *Gonorrhœa* in Man, I now come to that in Women, but firſt it is proper to ſay ſomething in particular, as to the Opinion of Authors concerning it, which they have taken as much Pains, though not altogether ſo differently, to fix as wrongfully in them, as in the Men, but the diſpute on their ſide, not having been ſo much the buſineſs of Authors, as to Men; I ſhall not need to ſay ſo much about it. The Opinions of many Authors are, that the Seat of *Claps* in Women is in their *Teſticles*, or rather *Ovaria*: Others, that it is in the *Cervix*, or *Vagina Uteri*, or *Neck* or *Sheath* of the Womb. Others again, that it is in the *Fundus* or bottom of the *Uterus* or Womb it ſelf. But to clear the matter it will be neceſſary to ſpeak to each of thoſe Opinions apart, yet that cannot ſo properly be done, before the parts of *Generation* in a Woman be deſcribed, which I ſhall do, but yet as conciſe though plain as poſſible, brevity and perſpicuity being what I all along intend. Firſt, then I ſhall ſpeak of the *Teſticles*, or rather *Ovaria* of a Woman, which lie near two Fingers diſtance from the Womb, near the Terminations of the *Fallopian Tubes*, and are faſtned to the Womb, by the *Vas differens* or ſtrong Ligament, as alſo to other parts adjoyning. Theſe *Ovaria*, *Teſticles*, or Stones in Women are not above half ſo big as thoſe in Men, nor are they ſo Round, but more Flattiſh, differing alſo in Subſtance, being a Maſs of little Bodies, or Eggs replete with a Subſtance Limpid and Tranſparent, like the white of a raw Egg, and which when boil'd, have the exact Similitude as they have. Theſe little Eggs in Women, when they are impregnated by the Spirit of t Seed in Man, conveyed to them throu the *Tubæ Fallopianæ* before ſpoken of, wh are *Ducts* about ſix Inches long that op into the Womb, and though the *Orifices* them are very Small, they grow Large nough upon Coition, both to convey fu a portion of the Seed caſt into the Wo to the *Ovaria*, to impregnate them, and fer them when fecundated to come into Womb to be form'd a Child, I ſay wh it is ſo, a Woman may then be ſaid to h conceived, therefore this is plain that Seat of a Virulent *Gonorrhœa* in Women, not in the *Teſticles* or *Ovaria*, becauſe diſtance is ſo great as that the *Virulency* co veyed by the Man cannot be a *Gonorrh* or Running, becauſe the *Tubæ Fallopianæ*, contract themſelves a little while afterwar as not to admit any thing from them; b there might be a *Pox* indeed, which I lieve few if any, have ever obſerved. H ving plainly ſhewn why the Malignity o *Clap* in Women has not its Seat in the *Te cles* or *Ovaria*,, the ſame Reaſons alſo ſh why it very ſeldom if ever takes up its S in the *Fundus Uteri*, or bottom of the Wo it ſelf, though it is the Opinions of ſo very topping Authors, that it generally do becauſe of the quantity of the Runni which Women diſcharge that are Clap but the ſame Reaſons I ſay that makes one makes for the other, tho' I allow t in a vigorous Attack, and when the W man takes a great pleaſure in the Act, Venereal Poiſon may be carried with Seed ſo far as to the bottom of the Wo and fix the Infection there as well as on part of the *Vagina Uteri* or ſheath of Womb, where generally the Seat of I

ion is in moſt Women, thoſe parts being ry Lax, and all overſpread with little *Mu-s Glands*, whoſe *Tone* when hurt by the enereal Poiſon, emits a Liquor, and with at a corrupt Humour, which conſtitute a *norrhœa*, and is called a Running of the eins or *Clap* in Women, and when the Ma-gnity of that Infection is taken off by pro-r Medicines, what remains of a Run-ning afterwards, as it does in very many Women, is what is call'd the Whites, few of them getting clear of ſuch an Accident as a Clap, but that at laſt it degenerates into them, or at beſt are left in that Condition, their ſecret Parts being the ſink of the Body, and ſo more liable to that troubleſome grievance ſo common to the Sex.

Of the Operations perform'd on the Bladder, *&c. From M.* Dion; *and of cutting for the* Stone.

ONE of the greateſt and moſt difficult Chirurgical Operations is the extraction of a Stone out of the Bladder: *Hypocrates* found it ſo Painful and Dangerous, that he reſolved never to attempt it; and moſt Surgeons in our Days following the examples of the Ancients inhibit the performance of it, leaving the Execution thereof to thoſe who make it their ſole Buſineſs, and apply their utmoſt care to excel in it. The *Greeks* term'd theſe ſort of Operators *Lithotomoi*, and we call them *Lithotomiſts*, from *Lithotomy*, which ſignifies in the Greek to cut the Stone: By *Lithotomy*, then we underſtand a Chirurgical Operation, by which we extract out of the Bladder, the Stones therein contained; and under the name of the Stones, we generally comprehend all exotick Bodies; as clots of Blood, Membranes, hardned Fleſh, and whatever by their Maſs, Bigneſs and Conſiſtence, obſtruct the courſe of the Urine, and oblige us to apply this Operation to clear the Organ.

When a Stone diſengages it ſelf from the Kidneys, and makes its way to the Bladder; if ſmall it ſlides eaſily into that Purſe, but if great, being obliged to dilate the *Ureter*, it occaſions violent Pains, which are properly call'd *Nephritick* Pains, from the *Nephri* the Rein or Kidney.

I have told you that Stones paſs through the Ureters from the Reins to the Bladder: Thoſe perſons to whom this happens have their Ureters dilated in proportion to the Stones which paſs through their Conduit, which not being generally larger than a Quill, is ſometimes found extended to the bigneſs of a Thumb, and ſometimes to the ſize of an Inteſtine; and though this part is capable of ſuch an Extenſion, yet we meet with ſome inſtances of the Stones ſtopping in its Cavity: But theſe ſorts of Stones remaining in the Kidneys or Ureters cannot be extracted by Surgery; therefore let us paſs to them in the Bladder, which are the ſubject of our Operation.

Before we proceed to *Lithotomy*, 'tis requiſite that we be ſatisfied that there is a Stone in the Bladder; the Signs which indicate to us are of two ſorts. The firſt which we call common or equivocal, may depend on ſeveral Diſeaſes of the Bladder, different from thoſe cauſed by the Stone in the Bladder; the ſecond ſtyled Proper or Univocal, are ſuch as are only peculiar to the Stone. The equivocal ſigns are very Numerous, the Patient is afflicted with a continual Pain in the Region of the Bladder, which is greater when he goes to make Water: Beſides, when he ſtrains there is a falling out of the Fundament; at other times the Patient feels a preſſure on the *Perineum*, has involuntary Erections, produced by irritation of the Ureter, and difficulty of Urine: Now tho' all theſe Symptoms denote a Stone in the

Bladder they are not certain Signs; for they are alſo proper to Inflammations and Ulcers of the *Bladder* and *Urethra*, wherefore they are term'd Equivocal, and oblige us to have recourſe to others which are Infallible; and theſe are the Finger and the Probe. The Surgeon then in Men puts his Finger up the *Anus* as far as he can, and there being only the thickneſs of the *Rectum*, and Bladder betwixt his Finger and the Stone, 'twill be eaſie for him to feel that exotick Body, eſpecially holding the other Hand againſt the Region of the *Hypogaſtrium*, he puſhes towards the *Rectum*, any thing whatever that may ſtick in the Bladder. In Women, the Matrix being placed betwixt the great Inteſtine and the Bladder, the Lithotomiſt cannot feel the Stone the ſame way as in Men; wherefore he muſt thruſt his Finger into their *Vagina*: But in Virgins, for ſeveral Reaſons which I paſs over in Silence, he muſt not make uſe of his Finger, neither in the *Vagina*, nor in the *Rectum*, but muſt do it with his Probe.

Tis not ſo eaſie to probe a Man as a Woman; the length and curve Finger of the *Urethra* in Men, are the Cauſes of the difficulty of introducing a Probe, to perform which Addreſs and Practiſe are neceſſary. The Chirurgeon then takes a Probe ten or eleven Inches long, and as big as a Writing Quill, generally made of Silver, half of its length being ſhap'd like a Creſcent, and the other half ſtraight. The end of the curve is half blunt, and the Extremity of that which is ſtraight, provided with two Rings, in order to hold it faſter. He oils his Probe, and prepares to introduce it into the Bladder, by thruſting the Curve part firſt into the *Urethra* or urinary Paſſage: But there being two ways of Probing, 'tis the Chirurgeon's part to chuſe that which he is moſt accuſtomed to practiſe; the one is, that of taking the Patient's Yard betwixt the Forefinger and Thumb of the left Hand, and mounting it upwards, whilſt he holds the Probe in the ſame Finger and Thumb of the right Hand, in ſuch manner that the concave Part of the Creſcent is towards the Patient's Belly: Then having ſoftly introduced its end into the *Urethra*, he thruſts it forwards 'till it reach the Root of the Yard, when he lowers it, at that Inſtant, that its Point mounting upwards by paſſing below the *Os Pubis*, may proceed into the Bladder. The other way differs from the former, in the back of the Probe being turned toward the Patient's Belly, and that when 'tis thruſt as far as the Root of the Yard, the Inſtrument muſt be half turned about, inclining it jointly with the Yard towards the right Groin, and afterwards lowering it; by which means its Point, puſhed on by a ſmall Impulſe, will enter the Bladder: And this laſt way of probing is practiſed by almoſt all Lithotomiſts, who herein ſhew their Dexterity by this Maſter-piece of their Art. If when the Probe is ready to enter the Bladder, it meets with any Obſtacle, it ought not at all to be forced forwards, becauſe the Obſtruction may be occaſioned by a ſmall Valve, termed the *Verumontanum*, which is the Place where the ejaculatory Veſſels pierce the *Urethra*, and the leaſt Violence offered, would not fail to hurt this Valve; wherefore the Probe muſt be withdrawn a Finger's breadth, in order to puſh it forwards again, and remove it from the Obſtacle; and thus the Chirurgeon finds his way into the Bladder.

The *Urethra* in Women being ſhort and ſtrait, 'tis not very difficult to introduce the Probe into it. The Patient being lain on her Back, with his left Hand the Chirurgeon ſeparates the *Nymphæ*, and diſcovers the Orifice of the *Urethra*, which is a ſmall round Hole, ſituate between thoſe two Tufts below the *Clitoris*. He then takes into his right Hand a Probe of the ſame bigneſs of that for Men, about ſix or ſeven Inches long, but ſtraight, which having oiled, he gently introduces in the Bladder, and as well in Men as Women, turning the Probe to the Right and Left, if there be any Stone he will ſoon diſcover it, by the Reſiſtance it will make to his Probe, and the audible Noiſe which the ſtriking the end of it againſt that Body will occaſion.

If by the Probe the Chirurgeon is fully convinced that one or more Stones are in the Bladder, the ſole way of extracting them is by Operation, which is performed one of the two ways which I ſhall ſhortly demonſtrate to you; for 'tis a miſtake to think that there

here are any Medicaments capable of diſſolving a Stone in the Kidneys or Bladder. All the boaſting Pretenders to the diſcovery of any ſuch Remedies are Empyrics and Impoſtors, who taking advantage of the miſerable Condition of the Patient, and his fearful Apprehenſions of this Operation, promiſe more than they can perform. I don't blame a Patient endeavouring to avoid the Pain which that Performance muſt give him, nothing is ſo natural as to throw ones ſelf into the Hands of thoſe who offer us a certain and eaſie Cure: But theſe ſort of People rather deſerve Puniſhment, by reaſon their Promiſes are ſhocking to good Senſe. There is no ſort of Diſſolvent, how vigorous ſoever it may be, that is able to diſſolve a Stone out of the Bladder; and the Reaſon holds much ſtronger againſt the Poſſibility of finding any that ſhould be ſtrong enough to perform that Diſſolution in the Bladder it ſelf, after having paſſed through the different Conduits, which 'tis neceſſitated to run through to arrive there, ſuppoſing it taken at the Mouth. If ſtrong enough to anſwer this end, what effects muſt it have on the Stomach, Inteſtines, lacteal Veins, Thoracick Channel in the Heart, Lungs, Arteries, Veins and Ureters; at all which parts it muſt touch before it reach the Bladder, the Reſidence of the Stone which they pretend to diſſolve. And farther, if theſe Diſſolvents are to be injected through the *Urethra*, will not the Urine hinder their Succeſs, or will they not rather corrode the Bladder than the Stone?

'Tis then but a poor Refuge, to hope for Cure by Medicaments; when the Stone is once formed, nothing but *Lithotomy* can draw it out of the Bladder: So that 'tis the Patient's part frankly to determine in favour of the Operation; and with utmoſt Expedition, diſpoſe himſelf for it, when the Probe has convinc'd him, that all the Evils which he ſuffers are the Effects of a Stone in the Bladder; for the longer he defers it, the more the Stone increaſes, and the Performance of the Operation becomes the more Difficult and Painful. But if upon probing no Stone be found, and yet the Patient continues to feel the Accidents which it uſually occaſions, and particularly the Suppreſſion of Urine, the moſt fatiguing of all of them, the Chirurgeon muſt relieve him as ſoon as the caſe will permit, either with regard to it as the Diſeaſe it ſelf, or the Effect of another Diſtemper.

The Suppreſſion of Urine is of ſuch Importance, that 'tis ſcarce poſſible to retain ones Water above one Day, without being reduced to the laſt Extremity. When the Chirurgeon is come to the Patient, this Diſeaſe requires no Delay; for frequently, in theſe Caſes, he is not ſent for 'till the Patient has been long without voiding any Urine; and though never ſo little deferred, the Bladder yet fills more and more, the Pain and Danger Augment; for which Reaſon the Chirurgeon ought immediately to go to Work, for the Moments are highly valuable, and 'tis not in his Power to give a too expeditious Satisfaction to the Impatience of the Patient, who with moſt preſſing Inſtances implores his Aid.

Theſe Reaſons have engaged us to ſhew the Methods of relieving the Suppreſſion of Urine, before we demonſtrate to you the Operation to be performed for the Extraction of the Stone. We muſt go firſt to the Patient, which is moſt in haſte, for we lie under an indiſpenſable Neceſſity of frequently voiding our Urine; but as for the Section, we are at Liberty to chuſe the time, Seaſon and Day, at Pleaſure.

There are three ſorts of Suppreſſion of Urine, each of which is diſtinguiſhed by its peculiar Name; the one of which is *Dyſuria*, the other *Stranguria*, and the third *Iſchuria*.

When a Patient does not void his Urine without Difficulty, this Indiſpoſition is called *Dyſuria*; which word is derived from *Dys*, which ſignifies difficult; and *Ouron*, Urine, by reaſon its Paſſage is accompanied with Difficulty and Pain.

When the Patient piſſes only drop by drop, this Diſeaſe is called *Stranguria* or *Strangury*, from *Stranx*, a Drop, and *Ouron*, Urine, becauſe no more than a Drop comes at once; whence this Diſtemper is alſo called the Piſs-dropping.

If the Urine doth not paſs at all, 'tis an *Iſchuria*, a Word derived from *Iſchein*, to retain; and *Ouron*, Urine; it being

a total **Retenſion** and intire Suppreſſion of **Urine.**

There are two ſorts of Suppreſſion of Urine; the one, when that Excrement is contained in the Bladder, and cannot iſſue out; and the other, when 'tis ſtopped above the Bladder.

We find five or ſix Cauſes which obſtruct the Paſſage of the Urine out of the Bladder: Firſt, when ſome Stone is placed at the Mouth of the *Urethra*, and ſtops that Paſſage; when it is to be puſhed back with a Wax Candle, or a Probe, or diſplaced even by Extraction, if after ſeveral times removing the Patient, it ſtill continues in the ſame place. Secondly, When the *Urethra* or urinary Paſſage is ſunk, and as it were ſhrivel'd, as it happens to old Men, when the Erection of their Yard ceaſes: This is cured by hot and aromatick Fomentations which invigorate that Part. Thirdly, when an Inflammation happens to the Neck of the Bladder, or urinary Paſſage: In which caſe ſuch Medicaments are applied as aſſwage the Pain, and moderate the Ardency of the Blood. Fourthly, when 'tis occaſioned by a ſluggiſh thick Flegm contained in the Bladder; that pituitous Matter is drawn out by the Probe. Fifthly, when the Bladder being too full, the Fibres, which extended to an exceſſive Degree, loſe their ſpringy Motion, and are no longer able, by Compreſſion, to force out the Urine; this is what frequently happens to Children, after being long without Piſſing: In this caſe the *Pubes* is to be rubbed with Oils, as that of Capers; and the Artiſt is alſo to have recourſe to his Probe. To theſe is added a ſixth Cauſe of the Retention of the Urine, which is ſaid to be a *Carnoſity*, which is to be Conſumed; but I am not throughly convinced that there is any ſuch thing.

We find two cauſes which hinder the Paſſage of the Urine into the Bladder: The firſt is a malignant and continual Fever, which, by its exceſſive Heat, ſo inflames the Parts, and eſpecially the Kidneys, whoſe Pores are too cloſely locked up, or the Fibres too much Relaxed, or whoſe Ferments are ill diſpoſed for the Separation of the excrementitious Seroſity of the Blood; and the ſecond is, when the Urine is detained above the Bladder by Stones, either in the Rein or Ureters, which ſtop its Paſſage.

We diſcover the Suppreſſion of Urine t be in the Bladder, by the Tumour, Pai and Tenſion which the Patient is ſenſible in the Region of the *Pubes*; on the contrar if this Liquor is ſuppreſſed above the Bla der, that Region is ſunk in, ſoft, hollo and free from Pain; and when the Uri cannot be ſeparated from the Blood, it b comes too watery, the Patient's Strength d miniſhes daily, and he dies.

The Judgment which the Chirurgeo ought to paſs on the ſuppreſſions of Urin is, that thoſe which detain the Urine in t Bladder by what Cauſe ſoever, may be cu red; but thoſe who keep it above the Bla der are very often Mortal, not affording ny hope but from ſome Criſis which 't proper only for Nature to produce by extraordinary Effort. Suppreſſion of Uri in the Bladder is cured either by Medic ments, or Inſtruments.

The Medicaments are *Baths*, *Embrocation Plaiſters*, *Unctions*, *Humectations*, *Foment tions*, *&c.* applied to the Yard, *Pubes* or P *rinæum*, or introduced into the Bladder th the Yard. I ſhall not deſcribe them her a thouſand Authors have treated of them.

The Cure, by the Aſſiſtance of Inſtrumen is twofold, either Palliative or Curativ That call'd Palliative, is when we don't e deavour to remove the Cauſe, which con nually remains, tho' we ſtop or relieve t Symptom; as when we only thruſt back t Stone to give Paſſage to the Urine, it bei ſometimes poſſible for a Stone to contin forty Years in the Bladder. The Curati is when we remove both the Diſeaſe and t Cauſe; as when the obſtructive Humo and the Urine iſſue out by the Inſtrume which is introduced into the Organ.

This Operation is call'd *Catheteriſmus*, fr the Inſtrument by which it is perform which is term'd in *Greek* a *Catheter*, be deriv'd from *cata within*, and *ein to ſe* 'Tis an excavated and curve Probe, wh ſerves to draw the Urine out of the Bl der, and diſcover the Diſeaſes of that gan. The *French* call it *Algalie*, an *Ara* Word commonly importing a Probe.

Th

There are of these Probes adapted to both Sexes. One is of the largest Sort for Men; the other is lesser, in order to be used to Children; and the third is for Women. Those for Men are very much bent, to accommodate them to the Shape of the *Urethra*, and the Neck of the Bladder; and the other appointed for Women is almost strait, and shorter, because their *Urethra* or Urinary Passage is straiter and shorter than that of Men. The Chirurgeon must be provided with both these Sorts. He dips the End in Oil, that it may enter with the greater Facility.

The Ancients made these Sorts of Probes of Horn; they were afterwards of Copper, but are all at present of Silver. They must be hollow quite thro', and their Cavity provided with a Pin or Stiletto: They must not be pierc'd at their Extremity which is introduc'd into the Bladder, but on the Sides of that End, because that in touching the Membranes of the Bladder by that End, if it was bor'd, they would stop it, and the Urine could not enter into the Probe; but being perforated on the Side, tho' the Probe should even touch the Bladder, the Urine may easily escape. They ought not to be so weak, as to be in Danger of bending; nor too big, for fear of occasioning Pain: They must be even and well polish'd, to enter with the greater Ease.

Tho' I here shew you but three Probes, the Chirurgeon may yet provide himself with them of several Sizes, small ones for little Children, middling ones for Youths, and large ones for Men; but two Sorts are sufficient for Women, one small one for Girls, and a larger for those of a more advanced Age.

Here we should treat of the Introduction of the Probe into the Bladder, in order to draw off the Urine; but there being no Difference betwixt that and the Introduction of that Instrument to search whether there be any Stone, you need only remember what has been said on that Head.

The Probe being introduc'd into the Bladder, the Pin or Stiletto must be drawn out, in order to make way for the Urine to run thro' the Canal of the Probe. All the Urine being thus drawn off, the Probe must be gently drawn out; and this Operation renew'd as often as the Patient wants to make Water, as long as the Suppression continues.

'Tis not always in the Chirurgeon's Power to draw off the Urine by a Probe, because there are frequently Obstacles to the Introduction of that Instrument into the Bladder; and how dextrous soever he may be, he cannot get it into that Organ. *Lithotomists* themselves, notwithstanding their daily Practice of probing, have acknowledg'd their Inability of performing it in some Subjects, by reason of the insurmountable Hindrances which they find.

These Hindrances are either an Inflammation in the Neck of the Bladder and the *Prostatæ*, which so tumefies those Parts, that nothing can pass thro' the *Urethra*; or the Callosities of that Passage, caused by the cicatrizing of Ulcers, which so contract that Conduit, that 'tis impossible for the Probe to pass, whatever Efforts are made to force it in; or, lastly, some Tumours or membranous Productions which stop the *Urethra*, as it happens to some old Men, in whom the Passage so shrinks up, that neither the Urine nor Probe can open any Passage.

But, notwithstanding all this, the Patient must not be left to perish, and nothing but a Punction of the *Perinæum* can save his Life; for he must of necessity void his Urine or dye: 'Tis then the Chirurgeon's part to advertise the Patient's Relations and Friends, and give them such a Prognostication as the Nature of the Indisposition requires. After which, having disposed the *Apparatus*, he must place the Patient on the edge of the Bed, and lay him on his Back, his two Thighs wide extended, and his Knees bent, so that his Heels touch his Buttocks, causing the Legs to be held in this Posture by two Servants, and the *Scrotum* to be raised up by another: Then the Operator taking an Instrument made on purpose for that end, shaped like a Lancet, narrow, sharp Pointed, and about four or five Inches long, he thrusts it directly into the Bladder, beginning the Punction on the Buttocks Suture, in the same place where the Incision is usually made in *Lithotomy*; and he will discover what is in the Bladder,

der, by what iſſues out of the ſides of the Inſtrument; before he withdraws which, he muſt gently thruſt the ſtraight Probe along the ſide of it into the Bladder. This Probe muſt be guided with the left Hand, and the Inſtrument drawn out with the Right, with which the Operator next takes a Silver Pipe of four Inches long, with two Rings at its Head, through which run the Ribban, of an Ell and half long. The hind end of the Probe is then paſs'd into the fore end of the Pipe, which ſerves to conduct it into the Bladder; for if the Inſtrument which made the Puncture ſhou'd be drawn out before the introduction of the Probe, the Chirurgeon would run a riſque of wholly loſing his way when he endeavours to thruſt in the Pipe, wherefore the Probe is abſolutely neceſſary by way of Precaution. After the Urine is all voided by the Pipe, we ſtop the exterior Aperture of that Inſtrument with a ſmall Linen Tent, and leave it in the Wound. The Ribban run through the two Rings of the Pipe ſerves to faſten it to a Girdle, to prevent its ſlipping out of the Wound. Whenever the Patient would Urine, the Tent muſt be taken out, and the Bladder thus emptied as often as filled.

Of three Accidents which I have pointed out as thoſe which require this Operation of Punction, there is but one only which we can hope to cure, which is the Inflammation of the Neck of the Bladder, and the *Proſtatæ*; for the Operation being made, endeavours are us'd to cure the Inflammation, by Blood-lettings, Fomentations, Liniments, and other anodyne Applications: When 'tis moderated, and the ſwelling aſſwag'd, or come to ſuppuration, as it ſometimes does, the Tent muſt be taken out, bind up the Wound tight, and in this caſe we ſhall find the Urine returning to its ordinary Courſe, iſſue out at the Yard. But when the Calloſities in the urinary Paſſage, or a ſinking occaſion'd by Age, have oblig'd the performance of this Punction, the Patient muſt reſolve to wear this Pipe the reſt of his Life. In this caſe, inſtead of a Linnen Tent, a Silver Screw-Stopple muſt be uſed, which will ſhut it ſo cloſe that the Urine will never drain out, and the Patient is left in Condition to follow his Affairs, with this Inconvenience only, that he cannot make Water without unſtopping his Pipe, as I have ſeen ſeveral who wore them until their Death.

This Operation though it conſiſts in no more than a ſingle Punction, yet requires the Chirurgeon's Anatomical Knowledge of the diſpoſition of the Places where he makes it, as well in order to guide his Lancet directly into the Bladder, as to know what part it may hurt in its Paſſage; he ought alſo to ſee it perform'd ſeveral times before he attempts it himſelf, for it will affright a Chirurgeon not very well vers'd in Anatomy, or which has never ſeen it done: But thoſe who are Maſters of the Practice of it, will find it one of the eaſieſt in Chirurgery.

This is the Method hitherto obſerved in the Punction of the *Perinæum*; but that which *Frere Jaques* has furniſh'd us with in order to extract the Stone out of the Bladder, of which I ſhall preſently give you the Hiſtory, has given me occaſion to think that this Punction might more ſecurely be made at that part of the Bladder where the Inciſion is uſually made for the Stone, that is in the Body it ſelf of that Organ near its Neck; ſo that the Lancet need not be plung'd into the *Urethra*, and forc'd to paſs through the Neck of the Bladder, except in caſe of an Inflammation in which 'tis ſo tumefied that nothing can come out, and one is in danger to cut the Neck with the Inſtrument to make a Paſſage; which may redouble the Accidents, and fruſtrate the Patient of the expected Fruit of Operation: But if we thruſt in this Inſtrument about a Finger's breadth from the *Perinæum*, and pierce the body of the Bladder near its Neck, I believe the Operation would be more ſecure and leſs Painful, ſince not piercing the *Urethra*, it ſhould not hurt the Neck of the Bladder, and the Inflammation being diminiſh'd or abated, the Urine would return to its natural Channel at our taking out the Pipe and cloſing the Wound, which is to be dreſs'd according to the manner, and will as eaſily heal as others; for we know at the time of day that Wounds in the Bladder are not Mortal, as was formerly believed, provided withal that they are not of a

wide Extent, and that 'tis poſſible for ſome neighbouring Veſſel to ſtick to them, and this Operation ought to be call'd *Cyſtitomia*, from its effectual opening of the urinary Purſe.

When the Finger or Probe has convinc'd us that there is a Stone in the Bladder, we are neceſſitated to proceed to Operation: 'Tis then the Chirurgeon's part to diſcourſe the Patient like a Man of Honour, if he deſires to diſtinguiſh himſelf from thoſe Mountebanks and Vagabonds, whoſe Ignorance and Poverty put them upon a thouſand baſe Practices, and the boaſting a thouſand Impoſtures; his Prognoſtick muſt be founded on the Hopes and Fears ſuggeſted by the true State of his Patient's Caſe, carefully avoiding the promiſing more than he is able to perform, as ſome do who practiſe the Operation of which we are treating.

To diſcharge the part of an exact and methodical Practitioner in the Performance of this Operation. The Chirurgeon ought more ſpecially to have his Eye on three things, and determine what ought to be done, *before, during*, and *after the Operation.*

The particulars neceſſary before the Operation are reduc'd to five Circumſtances; the firſt the choice of the Time, the ſecond the Preparation of the Patient by ſome general Remedies, the third is to reſolve whether 'tis to be perform'd by the leſſer or greater *Apparatus*, the fourth to prepare the reſpective *Apparatus*, and the fifth to place the Patient in a proper Poſture.

In order to the performance of all Operations, there are two eſtabliſh'd Times, the one of Neceſſity, which will not admit of being deferred; and the other of Choice, which allows the fixing on that which is most proper. The Ancients gave the preference to the ſecond with regard to *Lithotomy*, and have order'd us not to perform it but in the Spring and Autumn: But 'tis a miſtake to believe that it ought never to be done but in theſe two Seaſons, for provided that the exceſſive hot and the too rigid Seaſons are avoided, I am of Opinion that this Operation may be perform'd in the remaining Seaſons of the Year: 'Tis cruelty to ſee the Patients ſuffer what is in our power to relieve ſpeedily. I ſaw Monſieur *De Corneille*, Gentleman in Ordinary to the King, die whilſt waiting for the Spring, when he might have been cur'd if he had been cut when neceſſity requir'd it. 'Tis with this Operation, as with regard to Mineral Waters, which have hitherto been thought unfit to be taken at any other time than in Spring and Autum, and believ'd to be Mortal at any other Seaſon: But ſeveral illuſtrious Perſons have remov'd this Prejudice, by recovering by their means their Health at all times of the Year, and the moſt celebrated Phyſicians, Monſieur *Fagon*, amongſt others, preſcribe them to their Patients almoſt as frequently in Winter as Summer, as in the more moderate Seaſons.

The Preparation of the Patient before the Operation, is a neceſſary Precaution. He muſt be bled once or twice purſuant to his Strength, he muſt take ſeveral Clyſters, and purge twice if replete with Humours, and as often as Phyſicians ſhall judge proper; for to them belongs the Preſcription of general Remedies, they frequently aſſiſting the Chirurgeons with Advice and Preſence in theſe Operations: The ſucceſs of which ſeveral times depends on a due Preparation of the Patient. Nor muſt the Chirurgeon perform this Operation on the day of, or the day after Purgation, for fear leſt part of the Phyſick iſſuing out during the Section, very much interrupt it.

Before *John de Romanis*, a Phyſician of *Cremona*, who was the firſt inventer of the Extraction of the Stone by the *Apparatus*, and who practis'd it at *Rome* in the Year 1532, this Operation was perform'd by the *Leſſer Apparatus*; but at preſent both ways being practis'd, the Chirurgeon muſt determine his Choice before he goes about it, and reſolve which of them he intends to make uſe of, in order to make the neceſſary Preparations for either of them.

The *Leſſer Apparatus* requires no more than two Inſtruments, which are an Inciſion on the Stone, and a Crochet to draw out the exotick Body when diſcover'd; but the other Method requiring many more, is therefore call'd the *Greater Apparatus.*

They are both ſpread and ſhewn on the Table at the head of this Demonſtration, whither you ought to guide your Eyes.

That the Chirurgeon may the more commodiously perform the Operation, he ought to have a Purſe or Pocket faſten'd before him, in which he ſhould put all his Inſtruments except the Inciſion-knife, which he muſt cauſe a Servant to hold and give him when Time and Place ſerve. Two Advantages reſult from the uſe of this Pocket, one of which is, that it conceals from the Patient's Eyes the number of Inſtruments which naturally terrifies him; and the other, that the Operator finds them under his Hand whenever he wants them, without being oblig'd to ask for them.

The *Lithotomiſt* having then tied an Apron about him, over that faſtens his Purſe, and having drawn on his Arms two wide Linnen-Sleeves, next thinks of placing his Patient. In the Hoſpitals there is a Chair provided expreſly for that purpoſe, but in private Houſes we make uſe of a high Table, that the Chirurgeon not being oblig'd to ſtoop, may carry on his Work more at his Eaſe. The Patient is plac'd on the edge of the Table, after providing it with a Matraſs, under which a Chair is turn'd wrong end upwards, in order to form an inclining plain, on which the Patient muſt be lain backwards: Next with two Scarves or Saſhes, each of five or ſix Ells long, and two or three Finger's breadth broad, he is bound in ſuch manner as to enable him from interrupting the Operation by any Motion, he not being then able to ſtir. Two Servants take the Saſhes, which folding in two, they place the middle behind the Patient's Neck, and then deſcending and rolling them in croſs Squares around each Arm, the Thighs being fix'd againſt the Belly, and the Heels againſt the Buttocks, the Arm, Thigh and Leg of each Side are ſo bound together, that the Chirurgeon is abſolute Maſter of the Patient. He muſt have five Servants, two who on the right and left are to hold the Patient's Legs and Thighs, and draw them as wide as poſſible; whilſt the third mounting on the Table behind the Patient, preſſes with his two Hands on his Shoulders; the fourth is poſted on his right Hand, in order to raiſe up the Purſes of the Teſticles with one Hand, and hold them with the other whilſt the Inciſion is made, the Probe being engaged in the *Urethra* as far as the Belly; and the ſixth is to preſent the Inciſion-knife to the Operator, receive it from him when the Wound is made, and afterwards furniſh him with what he wants. On the Table muſt be plac'd a Baſon or Pot full of warm Water to waſh the Inſtruments which become too bloody during the Operation, and care muſt be taken to ſet a Plate with Oil of Olives, to oil the Probes before uſing them, or the Operator's Fingers before introducing them into the *Anus*. Thus you ſee what is to be obſerved before the Operation.

All things thus in readineſs, the Operator muſt go to work as faſt as he can, becauſe I ſuppoſe him reſolved on the manner of Operation, ſince 'tis impoſſible to extract the Stone out of the Bladder by either the leſſer or larger Apparatus as I have hinted. I ſhall now demonſtrate both theſe Methods that you may judge which is the beſt; for I am not willing to take any notice of the Method practis'd by ſome *Jews* and *Arabians*, of extracting the Stone without Inciſion, by the force of Inflation, becauſe I believe it impoſſible, if the Stone be allowed to exceed only the bigneſs of a ſmall Olive.

The ſmall or leſſer Apparatus deriv'd its Name from the very few Inſtruments which ſuffice to its Practice; namely, only an Inciſion-knife and Crotchet: But after the Chirurgeon has once try'd the great Apparatus, he will never cut any beſides Children by the leſſer. In this Performance there is no need of ſo many Servants, no more than two requir'd, one to hold the Child and the other to raiſe up the Yard and *Scrotum*. The firſt ought to be a ſtrong Man who being ſeated in a ſufficiently high Chair, places a Pillow under him, and hangs before him a Cloth down to the Ground, leſt his Legs ſhould be bloody. Thus poſted and provided, he takes the Child on his Knees, and having run his Hands under its Knees, he lays hold of its two Arms, which he extends in ſuch a manner as to render the poſture of the Child very commodious for Section. The ſecond Servant raiſes the Purſes of the Teſticles with his two Hands; then the Operator having oil'd the fore and middle Fingers of his

Hand, introduces them gently into, and thrusts them far into the *Anus*; the Palm of that Hand being turn'd upwards, he then feels in the Bladder, and with his two Fingers brings it towards the Neck of that Organ, and pushing it as far outwards as he is able, causes it to produce an apparent Tumour, on which with the Incision-knife, he makes his Incision proportionable to the size of the Stone. He ought not to be apprehensive of resting the edge of his Knife against the Stone for fear of blunting it, but on the contrary, he must cut whatever he meets of the Tumour clear to the Stone, without sparing even the Neck of the Bladder, that no small Fibres may remain to detain the Body. The Incision made, the Operator returns the Incision-knife to the Attendant, and with the same Hand takes the Crotchet, which he slides behind the Stone, in order to push it out, in which he is aided by his two Fingers in the Fundament. The Stone then being taken out without breaking, the *Lithotomist* must examine whether any more are yet left behind, that he may draw them out the same way, or with the Stone-Forceps, if not otherwise to be done.

This Operation, though easie to be perform'd, is not approv'd by all Lithotomists. They find it frequently attended with Circumstances which render it very dolorous: For instance, if the Stone be gravelly, rough or uneven, and has several acute Angles, the pushing it forwards to draw it towards the *Perinæum*, puts the Patient to horrible Pains, from its Points or Inequalities, pricking the Bladder, which is a very sensible Organ. They add, that being rough, the Incision of its Body is not to be perform'd without Difficulty, which confounds the Operator, and takes up a very long time to perform it as exactly as is requisite, to make way for the Stone to come out easily. These are the Inconveniences which make several Operators prefer the Grand Apparatus to the Lesser.

The second way of cutting is then call'd the Grand or greater Apparatus, from the great Instruments requisite to put it in Execution; 'tis that which is most frequently practis'd, and which to this present time has been concluded the best. The Patient being plac'd as already mention'd, and held fast by the Scarves and diversly posted, the Operator takes a Probe excavated like a Gutter on the back of its Curvure, and with regard to its dimensions proportion'd to the Subject; and after having dip'd it in Oil, he introduces it into the Yard, and thrusts it into the Bladder. With the end of this Instrument he searches for the Stone before Incision, in order to be again assur'd that there is really one; for 'tis not impossible that he may have been deceiv'd in his first Probing, wherefore if he does not find it in this second, he ought not to proceed any farther: But on the feeling that exotick Body at the end of his Probe, he causes it to by held by a Servant, who thrusts its Head downwards, that the curve part of this Instrument, which is first introduced, shoving outwards the interior Extremity of the *Urethra*, may the better discover to the Operator the proper place for Section. The same Servant with the other Hand holds up the *Scrotum*, and the Chirurgeon with the Thumb and fore Finger of the left Hand, extending the Skin of the *Perinæum*, takes in his right Hand the Incision-knife, ready mounted, which is presented to him by one of his Assistants on the right Hand, who ought to remember to give it to him by the Handle, and not by the Point, as he did to whom Monsieur *Marechal* gave it to hold him when he cut the Duke of *Grammont*, and who tendring him the Knife with the Point towards him, wounded his Hand, which had like to have interrupted the Operation. The Operator next, with all the Assurance of which he is capable, makes the Incision in the Suture of the *Perinæum*, which proceeds from the middle of the *Scrotum* to the *Anus*, he opens the *Teguments* and the *Urethra*, advancing his Instrument to the Groove of the Probe, which serves him as a Guide or Stay to prevent his cutting more than he intends. The length of this Incision must be from two to four Finger's breadth, pursuant to the size of the Stone. There are some Lithotomists who themselves hold the Probe in their left hand whilst they make the Incision with their Right; but this depends on the Habit which they have contracted, or the Masters who instructed them. The Incision is no

ſooner made, than the Inciſion-knife is immediately return'd to the ſame Servant who gave it.

The Lithotomiſts formerly made uſe of Guides, ſhap'd like ſmall Swords, of which the firſt had a Bill which continu'd thro' almoſt its whole length, and which eaſily ſlid along the Groove of the Probe into the Bladder; and the ſecond, had a Groove at its end, which ſerv'd to conduct it over the firſt into the ſame Organ, and betwixt theſe two Guides was introduc'd the Forceps; but almoſt all Operators have ſubſtituted in their place a Gorgeret, which they have found much more convenient. The Lithotomiſt ſearches for it in his Purſe or Pouch with his right Hand, and with the Left he takes the head of the Probe from the Aſſiſtant, to whom he had intruſted it; then placing the Bill which is at the end of the Gorgeret into the Groove of the Probe, he by that means guides it into the Bladder, facilitating the entrance of this Engine by ſeparating the head of the Probe from the Belly, with his left Hand, which makes way for the Probe and Gorgeret to enter together into the Bladder.

Some having made an Inciſion of a moderate length, and withdrawn the Probe, make uſe of the Dilator, to enlarge the Wound; pretending that a Wound widen'd by the Dilator heals ſooner than a very long Inciſion; becauſe that according to them the Fibres of the Neck of the Bladder are not cut, but only ſeparated by the Dilator: But yet this Practice is not univerſally approv'd; ſome prefer a larger Inciſion before the uſe of the Dilator; believing that it may occaſion a Fluxion about the Bladder, and produce ſeveral dolorous Accidents; and really during the ſpace of time which the Operator takes up to make the two Extenſions, one in breadth, and the other in length with this Inſtrument, the Patient is always heard to redouble his Groans and Cries; which prove the exceſſive Pains which he then endures, wherefore we adviſe the leaſt uſe of it poſſible. The Probe being withdrawn with the left Hand, the Operator takes the Gorgeret in that Hand, and with the Right takes the Forceps out of his Pouch. He generally makes uſe of the ſtrait one, which he introduces, ſhut into the Bladder, by means of the excavacated Groove along the Gorgeret. Immediately after this Introduction, with his left Hand he withdraws the Gorgeret, which he returns into his Pouch, and with the Forceps, ſhut, ſearches for the Stone on all ſides of the Bladder; he ought not to open them during the ſearch, becauſe in ſo doing he might frequently chance to wound the Bladder, or pinch it in re-ſhutting 'em. When the Stone is felt at the end of the Forceps, the Operator applying both Hands to the Inſtrument, gently opens it, and endeavours to charge it with the Stone, the ſize of which he diſcovers by the diſtance betwixt the one and the other Ring of that Inſtrument; and if it ſeem too large to be drawn out by the Inciſion already made, he turns the Stone looſe into the Bladder, and endeavours to take it up another way; becauſe it frequently happens that a Stone being ſhap'd like an Egg, that is oblong, is taken firſt up by its longeſt part and the ſecond time by its narroweſt, when its Extraction is much more eaſie; whilſt on the contrary, ſhould the Lithotomiſt obſtinately perſiſt in drawing out that exotick Body when he has graſp'd it longways, he would put the Patient to the ſuffering Martyrdom, and that ſome times in vain. There are tender gravelly Stones which crumble under the Forceps; When this happens the Bits muſt be taken out as well as the Chirurgeon can; there are ſome Stones ſo big that 'tis impoſſible to draw them out, in which caſe they are left there, rather than kill the Patient in taking them out. If there happen to be two Stones, which we diſcover by the Knob, at the end of the Curette or Scoop, after the firſt is drawn out the Forceps is again thruſt into the Bladder, and takes it up as it did the former: If there happen to be more, as we ſometimes find ten or twelve, the Forceps is to be introduc'd into the Bladder as often as any are left to be taken out. When the Stone is lodg'd on the right or left ſide of the Bladder, and we cannot come at it with the ſtrait Forceps, the curve ones are to be us'd; with them the Operator may take them up in whatſoever part of the Bladder they are lodg'd. There are flinty Stones, from the Superficies of which fall off

off ſome Fragments in taking them up with the Forceps; there are gravelly Stones which crumble under the Forceps, and there are frequently at the bottom of the Bladder a Sand and Gravel, which are neceſſary to be emptied after the Extraction of the Stone. In theſe occaſions we make uſe of the Curette or Scoop, with which we empty whatever is at the bottom of the Bladder, the Operation not being perfected ſo long as any exotick Body remains there. Having well cleanſed the Bladder, we take the ſmall Pipe, the end of which dip'd into Oil of Roſes, is ſoftly introduced into that Purſe, in order to be left there for ſeveral Days, according as neceſſity Requires; 'tis faſten'd to a Girdle by a String, run through the two Rings which are at its Head, that it may not ſlip out of the Wound.

After having ſpecified what is to be done before, and during the Operation, we are next to finiſh by deſcribing what is requiſite after its Performance. The ſmall Pipe being fixed and ſecured, which is that which finiſhes the Operation, we lay on the Wound a Quadrangular and a very thick Bolſter, which muſt be held by a Servant, in order to prevent the Air entring the Bladder, before we dreſs the Patient. In order to whoſe Preparation, he muſt be immediately looſen'd by taking off the two Scarves, when by two Perſons he is carried to his Bed, which muſt be provided with Sheets ſeveral times doubled, to prevent the Blood or Urine, which may drain through the firſt Days, ſpoiling the Bed. If before the Operation, neither the Band, called a Collar, nor that called a double, hath been applied, it is put on before we dreſs the Patient; when drawing nearer the *Apparatus*, requiſite for dreſſing the Wound, we take off the Bolſter, and lay on the Inciſion the two Pledgets; and overſpread with Aſtringents, and then the tail'd Plaiſter, and above that the large Bolſter; immediately after which we irrigate with Oil of Roſes, which ſtands ready in the ſmall Plate, the Scrotum, Yard, and whole inferior Venter; we raiſe up the Purſe of the Teſticles with a long Bolſter, which is called a Truſs, and the Belly we cover with what we call a Belly-piece. All theſe Bolſters are dip'd in *Oxycratum*, i. e. Vinegar and Water, which is in the Earthen-Plate, and faſten'd by the Bandage; the two Branches of which croſs each other on the Wound, and are turned upwards along the Groins, in order to faſten them to the circular Bandage, which ſurrounds the Body. We bind the two Legs together with a ſmall Band, call'd the Garter, that they may not, by ſtradling, re-open the Wound, and clap a Pillow under the Knees, in order to keep them a little Elevated; next which we end with giving the Patient ſome Reſtorative, or Liquor, which may a little renew his decay'd Strength. I ſhall not mention the ſupervening Accidents of this Operation, nor of the Dreſſing and Methods to be obſerved, in order to its Cure; to particularize all theſe Circumſtances, would require a whole Volume; I refer you to Monſieur *Tolet*'s Book, which has very well handled this Subject.

Monſieur *Thevenin*, a Member of the Company of Chirurgeons at *Paris*, and a Chirurgeon in Ordinary to the King of *France*, informs us, that there are ſome caſes in which we ought not to attempt the Extraction of the Stone out of the Bladder; for Inſtance, when we believe the Stone too large, or the Patient ſo old and weak, that he is not able to undergo the Operation, nor to endure the Violence of thoſe Symptoms which will attend an Inciſion ſo large as the Bulk of the Stone will require; but if that exotick Body, falling on the Neck of the Bladder, ſtops that Conduit, and frequently occaſions a Suppreſſion of Urine, we are obliged to ſhove it back with the Probe, in order to make way for the Paſſage of that Excrement; and it being poſſible that the frequent thruſting in and drawing out of the Probe, may fret and perhaps Gangreen the urinary Paſſage, he propoſes the following Operation: The Patient muſt be placed in the ſame Poſture as in the great *Apparatus*, then the Chirurgeon muſt introduce into the Bladder an excavated curve Probe, and on the crooked part of the Inſtrument make the ſame ſort of Inciſion, as though he deſign'd the Extraction of the Stone, with this difference only, that the Wound muſt be much leſs: Immedi-

tely afterwards he introduces a *Stiletto* into the Bladder, ſliding it along the Gutter of the Probe; this *Stiletto* ſerves to convey thither a Silver Pipe, about four Fingers breadth long; by paſſing it through the Cavity of this Tube, the *Stiletto* is next withdrawn, and we faſten the Pipe to a Girdle by a Ribbon run through the two Rings at its Head. This Tube is left to continue always in the Inciſion, and it hinders the Stone preſenting it ſelf to the Neck of the Bladder; and, floating on one ſide and on the other, gives the Patient an eaſier Life, and frees him in ſome Meaſure, from Pain, till he has recovered ſufficient Strength to undergo the Cutting; but ſometimes this Pipe ſo little incommodes him, that he chuſes rather to bear it than expoſe himſelf to the Operation, of which he may dye. This ſmall Pipe muſt be made to ſcrew at the Top, in order to retain and void the Urine at Pleaſure. This Pipe may alſo ſerve to make Injections into the Bladder in ſeveral Indiſpoſitions to which the Organ is liable.

This is the way of performing the Operation which Monſieur *Thevenin* teaches us; according to which Method, the Patient muſt neceſſarily void his Urine through the ſmall Pipe, that filling the Neck of the Bladder; for which Reaſon I ſhould adviſe the Introduction of a Pipe of the ſame ſhape with that which I uſe in the Punction of the *Perinæum*, I would ſay, into the Body of the Bladder at its Neck: There is no ill Conſequence to be fear'd from piercing it in this place, and the Patient would enjoy both the Advantages which he would find by Mr. *Thevenin*'s Method, which are to void his Urine whenever he pleaſes, and to hinder the Stone either falling into, or preſſing on the Neck of the Bladder. But another Advantage reſulting from the Method which I propoſe, is, that the Neck of the Bladder being free, and the Stone ſuſtained by the end of the Pipe, which ought to enter the Cavity of that Organ above a Finger's breadth, the Urine will iſſue out by the *Urethra*, its ordinary Paſſage; ſo that the Patient will be ſubject to no other Inconveniency, than the ſole one of being obliged to keep in this Pipe, without being forced to open it whenever he would diſcharge the Bladder of its Load of Urine, inſtead of unſtopping it as many times as it ſerves for an urinary Paſſage.

The third way of extracting the Stone, is called the *High Apparatus*, from its drawing out the Stone at the upper part of the Bladder; which Method is at preſent grown out of uſe. *Nicholas Franco*, a Chirurgeon of *Lauzane*, was the firſt that ever practiſed it; which he did on a Child, whoſe Stone was ſo large, that he could not extract it by the *Grand Apparatus*. He informs us, that in order to perform this Operation, we muſt cauſe a Servant to introduce two Fingers into the *Anus* of the Patient, with which, inſtead of puſhing the Stone to the Neck of the Bladder, as in the leſſer *Apparatus*; he muſt on the contrary thruſt it towards the *Fund*, or bottom of that Organ, then make an Inciſion at the bottom of the *Hypogaſtrium*, directly above the *Os Pubis*, and a little on one ſide the *Linea Alba*: The Muſcles being cut, we open the Bladder at its Fund, which is naturally turn'd upwards; then with a Crotchet, we drive the Stone as in the leſſer Operation. Though *Franco* tells us that this Operation ſucceeded under his Hands, he yet diſſuades us from the Practice of it, without giving us any reaſon for his ſo doing; we are aſſured Mr. *Bonnet* performed this Operation on Mr. *Relit*: For my part I don't think it ſo hazardous as it may be imagined; but believe it on the contrary leſs dangerous than the leſſer and greater *Apparatus*, and that the rather becauſe there is no duplicature of the *Peritonæum*, but the Bladder is ſo placed that it may be opened without touching that Membrane, or opening the Cavity of the *lower Venter*.

In order to the ſucceſsful performance of this we muſt introduce into the Bladder an excavated Probe; whoſe exterior aperture muſt be large enough to admit the entrance of a Syringe with which the Bladder is to be fill'd with Water, as warm as that of the Urine. We then make a Ligature about the Yard, that in Syringing the Water do not run out of the Bladder, along the ſide of the Probe; and when by the quantity of the Injection, we conclude that the Bladder

mu

muſt be full, we draw out the Probe, and pull the Ligature of the Yard a little tighter, in order to preſs the *Urethra* ſufficiently, to hinder the eſcaping of the Water out of that Paſſage: The Patient being ſeated on a Chair almoſt on his Buttocks, we make an Inciſion lengthways with a Pen-knife, betwixt the two Heads of the ſtrait, and the two Pyramidal Muſcles; after which reſting a Finger, on the Fund of the Bladder we feel the Fluctuation of the Water, with which 'tis Tumefied, when with a large armed Lancet we muſt make a puncture in that place of the Organ. We may eaſily diſcover when the Aperture is made in the Bladder, by the Water, which will run out immediately; after which, with a *Crotchet*, we may draw out the Stone, or elſe thruſt a long and narrow pair of *Forceps* into the Aperture through which the Water flows out, and having found the Stone in the Bladder, it will be eaſie to charge them with it, and draw it out at the Orifice. The Wound heals without Pain, by reaſon that keeeping the Patient in an almoſt erect Poſture in his Bed, the Urine which continually inclines to the Bladder, cannot reach the Wound and hinder its Cloſure, as in the two other ways of Operation; but beſides, always turns into its ordinary Paſſage in order to run off. If the Inciſion made on the Belly ſhould ſeem too large, and it be thought impoſſible to re-unite it with eaſe we may make uſe of a Stitch, and lay on the Wound a Pledget cover'd with *Arceus*'s Balſam, then a Plaiſter, over that the Bolſter and Roller, or circular Bandage made of a Napkin, in order to end with a Scapulary Bandage, which will ſecure the whole *Apparatus*.

All Stones have their beginning in the Kidney, and grow bigger in the Bladder; but don't all ſtay there, ſeveral of them following the Stream of the Urine, run out of that Organ with it, where they are yet but ſmall: But when a Stone has acquired an indifferent Bulk, and makes its way into the *Urethra*, it frequently ſtops there, and either by reaſon of its bigneſs or inequalities occaſions ſuch great Pain, that the Patient is forced to have recourſe to a Surgeon, who without any delay, is to endeavour to force it out, and that the rather, becauſe it ſtopping the Paſſage, he cannot empty his Bladder, which if not ſpeedily remedied wou'd prove of fatal Conſequence.

'Tis very eaſie to diſcover the place where the Stone is ſtop'd, the Patient himſelf ſhews it; and though we touch it never ſo little, we feel a hardneſs cauſed by that exotick Body. The Surgeon ought firſt to endeavour with his Fingers to make it ſlide along the *Urethra*, in which he is aſſiſted by the Urine, which puſhes forward in order to drive it out. But when he cannot procure its proceeding forwards without violent Pains, with a ſmall Band he muſt bind the Yard, beyond the Stone, towards the *Pubes*, and inject into the remaining part of the Paſſage of the Yard, Oil of *Olives* with a ſmall Syringe. The Ligature prevents the Injection driving back the Stone, and it's returning back the ſame way. This done, the Surgeon attempts to advance the Stone forwards, which is perform'd with much leſs Pain after the oiling of the Paſſage: But if he finds it impracticable to get it out, without more forcible means, he takes a ſmall *Scoop* about 4 or 5 Inches long, which he dips in Oil, in order to thruſt it up the Yard, and ſlide its end on one ſide, of and beyond the Stone, and by that means draw it out. This expedient frequently ſucceeds; but if it fails the Surgeon muſt proceed to Operation, without a Moment's Delay.

He muſt then take off his firſt Ligature, in order to draw the Skin which covers the Yard, as much as poſſible towards the Root of that part; and then apply the ſame Ligature above or beyond the Stone, when with the Left-hand turning the Yard, that the *Urethra* may be raiſed upwards, and holding the Stone faſt betwixt two Fingers, with a ſmall Penknife he makes an Inciſion on the Body of the ſaid Stone, cutting the *Tegument*s and the *Urethra*, not a croſs, but lengthways; which done, he takes a ſmall *Scoop* provided with a Handle, and ſhap'd like an Ear-picker, which he ſlips under the Stone, and by theſe means forces it out: That done he takes off the Ligature, and the Skin returning to its ordinary place, ſtops the Wound made in the *Urethra*. Theſe Wounds are dreſſed like the more ſimple ones, with a Plaiſter of *Ceruſe*, a Bolſter, and a Band, roll'd about the Yard in a cir-

a circular Manner: The Urine paſſing thro' the *Urethra* cleanſes and cures it, with the aſſiſtance of Surgery.

I have frequently found that the Stone, after having made all its way, in order to paſs through the *Urethra*, has ſtopt at its Extremity; which happens to thoſe, the aperture of whoſe *Glands* is ſmaller than it ought to be, which are very often ſeen towards the inſertion of the *Urethra* into the Root of the *Glans*. A Child was once brought to me which had a Stone ſtop'd at the end of the *Urethra*, and finding one end of it to be coming out, I made uſe of the point of a Lancet to diſtinguiſh this part of the urinary Paſſage above and below, and with a ſmall *Forceps* drew it out.

Though the *Urethra* in Women is ſhorter and larger than that of Men, and by reaſon of this favourable natural Diſpoſition, ſmall Stones, Sand and Gravel may more eaſily paſs with the Urine; that Sex is not yet exempted from being afflicted with Stones in the Bladder, which fatigue them as much as thoſe in Men, and as neceſſarily muſt be removed by Operation. Women are generally cut two Ways, either by the Leſſer or Grand *Apparatus*.

That of the Leſſer *Apparatus*, not only requires few Inſtruments, but is executed without making any Inciſion, in the following manner, *viz.* The Woman being ſeated in a high Chair, leaning backwards, her Thighs extended wide, and raiſed, the Surgeon takes a Probe, dips it in Oil, and through the *Urethra* conveys it into the Bladder, in order to ſearch for the Stone: The excavated part of the Probe ſerves to guide a *Dilator* into the Bladder, which is no ſooner entred than the Probe is drawn out, and the Operator extends the *Urethra*, with the Dilator, to the performance of which no great efforts are requir'd, that Paſſage being Dilatable beyond the bounds of Credibility. This done the Surgeon withdraws his Inſtrument, and having oil'd two Fingers of his Left-hand, introduces them as is before hinted, into the *Vagina*, if the Patient is a married Woman, and into the *Anus* if a Virgin; and with his Right-hand preſſing the Belly, he gently moves the Stone to the Neck of the Bladder, from which it eaſily enters the Mouth of the *Urethra* already Dilated. When he diſcovers the Stone, removing his Right-hand from the Patient's Belly, he ſubſtitutes that of a Servant in its place, and retaining the Fingers of the other Hand ſtill in the *Vagina* or *Anus*, he with them puſhes the Stone into the *Urethra*, then ſlides behind it the *Crotchet* in order to draw it out, as is done in Children cut by the leſſer *Apparatus*.

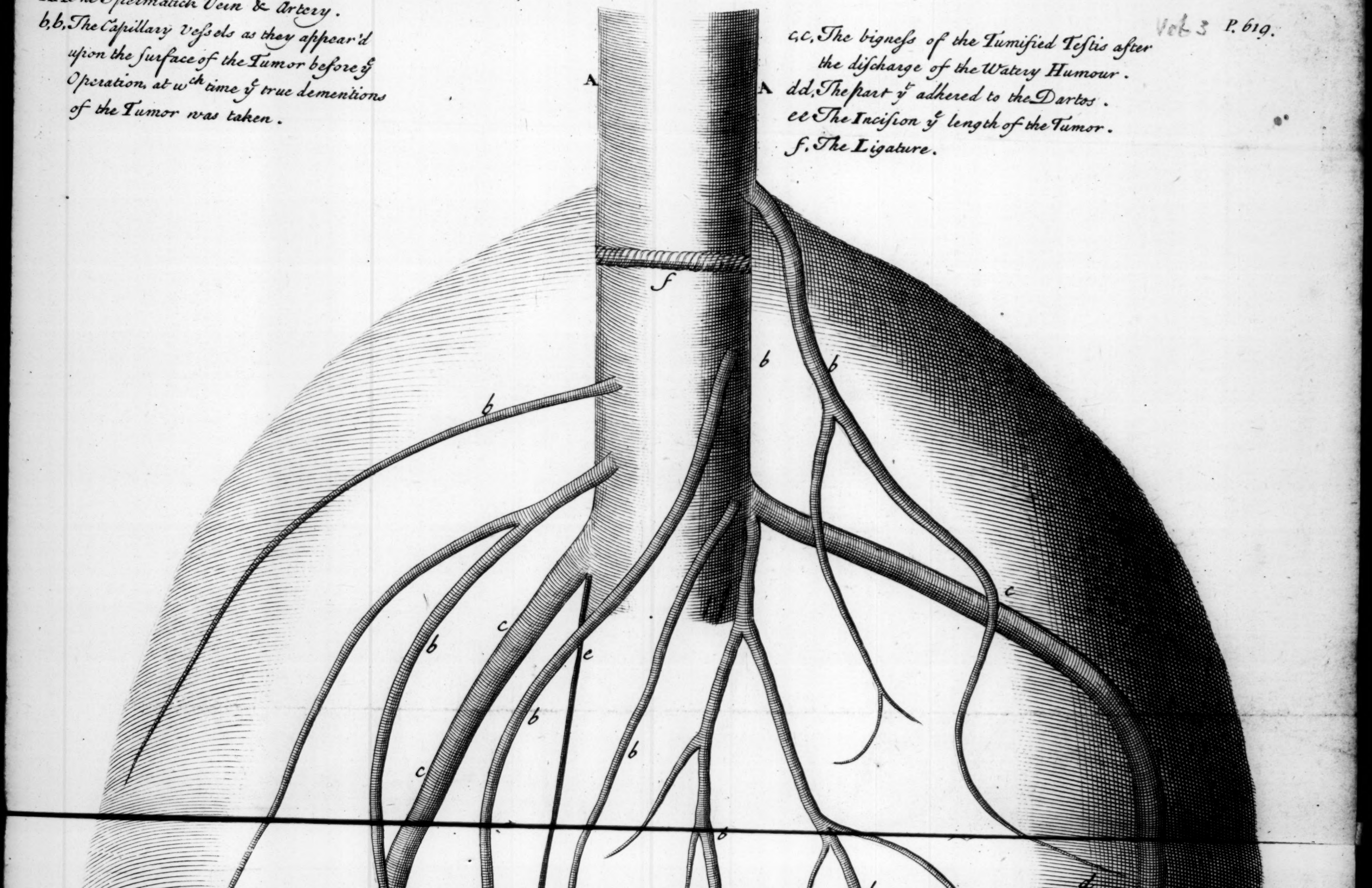
Some Operators affirm the great *Apparatus* to be leſs painful than the Leſſer, and prefer it for that Reaſon; but after explaining what farther remains, I ſhall leave it to your Deciſion. The Patient muſt be ſeated in a Chair bound with Scarves, and held by Servants, and into her *Urethra* muſt be thruſt a Probe or Conductor which may ſerve to guide a ſimple *Dilator* made purpoſely for Women, of which there are three Sorts; the choice of either of them is left to our Liberty; but that with the Spring is moſt uſed, having gently widen'd the *Urethra*, and the Dilator being open'd with a ſtrait Inciſion-knife, the extream Orifice of the urinary Paſſage muſt be cut a little to the Right and Left. This Inciſion muſt be larger or ſmaller in Proportion, according as we conclude, the Stone to be great or little: The *Dilator* is then drawn out, and on the *Probe* or *Conductor* which muſt be firſt thruſt into the *Urethra*, we guide the *Forceps* into the Bladder, and then withdraw the *Conductor* with the *Forceps* we ſearch for, and ſeize the Stone, which we muſt draw out by gentle Motions alternatively on the one ſide and the other, without any great Force. We may make uſe of a ſmall *Gorgeret* ſomewhat narrower than that uſed in the Section of Men: And ſome content themſelves with an excavated Probe: The fewer Inſtruments we uſe the better.

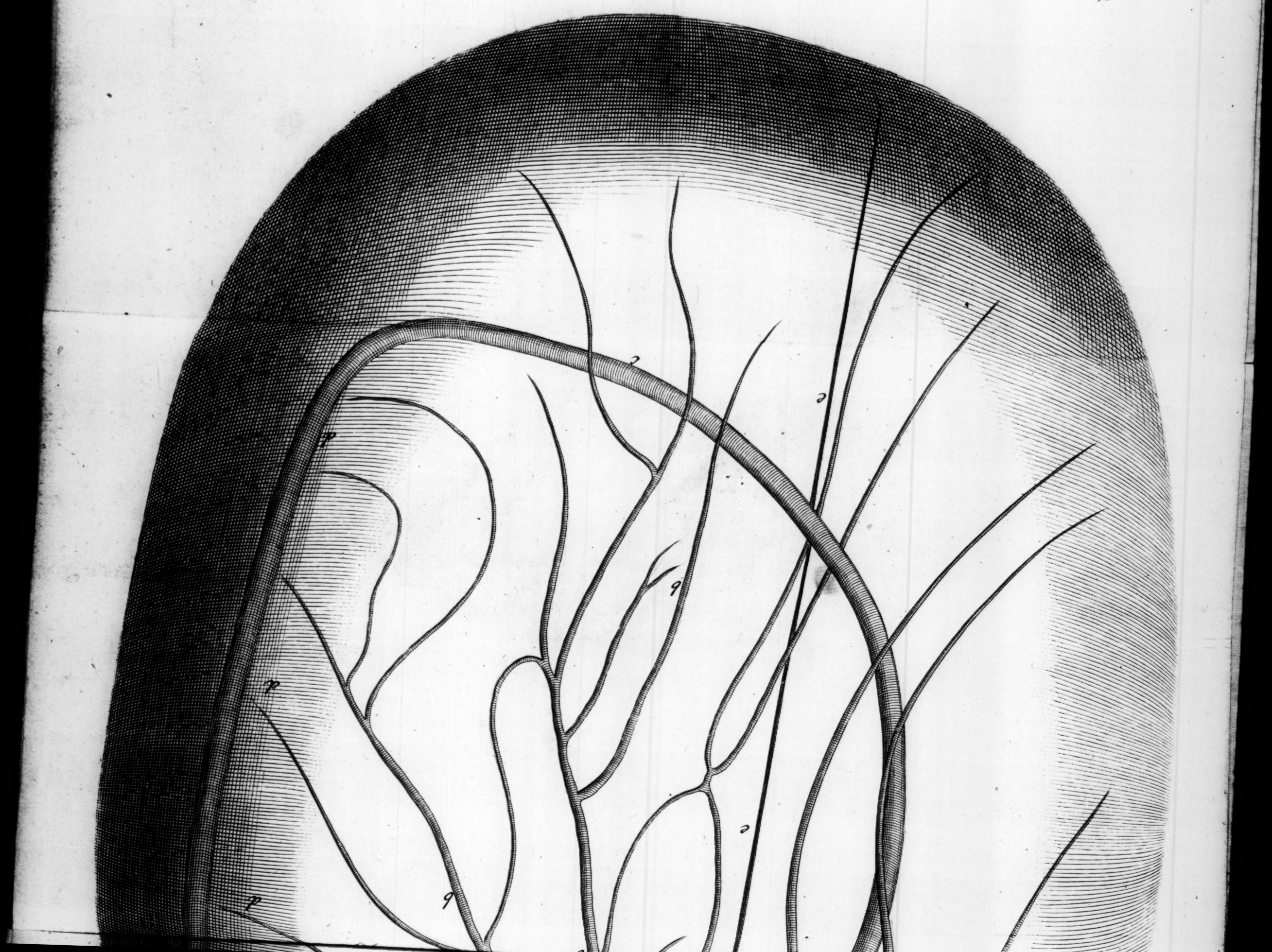
In above three fourths of the whole number of Women which are cut, there remains an involuntary Evacuation of Urine, eſpecially in thoſe from whom a large Stone has been taken. This accident never fails to attend them by reaſon that the too great Dilatation forces and breaks the Fibres of the *Urethra* and *Sphincter*. If we could extract the Stone by the high *Apparatus*, this inconvenience would be avoided; but I dare not adviſe it before having ſeen it ſeveral times practiſed, yet ſince that way has been found to ſucceed with Men, I don't doubt but it may be proper for Women. *Seve-*

AA. The Spermatick Vein & Artery.
b,b, The Capillary Vessels as they appear'd upon the surface of the Tumor before ye Operation, at wch time ye true demenitions of the Tumor was taken.

Vol 3 P. 619.

c,c, The bigness of the Tumified Testis after the discharge of the Watery Humour.
dd, The part yt adhered to the Dartos.
ee The Incision ye length of the Tumor.
f. The Ligature.




a
p
g
p
g
a
p
g
a

Several Remarkable Caſes which have been communicated to us by Phyſicians, Surgeons, &c.

SIR,

I Here ſend you the exact Figure of a tumefied *Teſtis*, which wants a Name, for it was not, *Hernia Aquoſa*, nor *Hernia Carnoſa*, nor *Hernia Seminalis*, but a complication of them all three; as you'll find if you'll pleaſe to give your ſelf the trouble of reading the following Hiſtory of the Operation.

The Patient's Name is *John Roberts*, lives at *Foulden* in *Norfolk*, his chief Buſineſs is Hempdreſſing, he is not ſenſible of the leaſt Hurt, or previous Diſtemper, that ſhould occaſion this prodigious Tumour, unleſs ſtanding in the Water above the Middle, by the whole day together, and that for a Fortnight ſucceſſively, (as thoſe People are obliged to do, when they Water-ret their Hemp) ſhould be the occaſion on't.

The Tumour increaſed to the Bulk you ſee expreſſed in the Figure, in Nine Months Time, and what with the Pain, and Weight of it, he was reduced to a Sceleton; when he firſt offer'd himſelf to me as a Patient, I declin'd it, thinking it impoſſible, he ſhould ſurvive the Operation. He return'd Home diſſatisfied, and in leſs than a Month after, (his Pain increaſing) he return'd to me again, with ſo much Reſolution to have it perform'd, that I could not deny him; ſo on the 8th of *Semptember*, I call'd my very good Friend Dr. *Barker* of *Linn* to my Aſſiſtance, and having alſo, (by chance) the aſſiſtance of my Friend Mr. *William Ellis*, of *Cotton* in *Suff.* who was formerly my Servant: We perform'd the Operation, an exact account of which follows.

After having fixed him on his Back, upon a Table; and a ſtrong help about him to hold him faſt, I cautiouſly divided the *Scrotum*, by a ſmall Inciſion, no larger than juſt to receive the end of my Thumb, fearing that the weight of the Tumour might have ſo relax'd, and diſtended the Peritonæum, that (with the ſtrugling of the Patient) the Inteſtines might prove troubleſome, which the Aſpect of the part gave us no ſmall reaſon to ſuſpect; but I was ſoon undeceived, for, perforating the *Dartos*, I was ſaluted on the Face, with two or three Spoonfuls of urinous Matter, of a yellowiſh Colour, altogether inodorous, I immediately ſtop'd the Orifice, and call'd for a Baſon, in which I ſaved a Quart of the ſame Humour. I then with a pair of large Probe-Sciſſers, divided both the *Scrotum* and *Dartos*, the whole length of the Tumour, and turn'd out the tumefied *Teſtis*. The ſpermatick Vein and Artery, I found as big, as repreſented in the Figure, which I ſecur'd by a ſtrong Ligature, and then divided them, but inſtead of the *Teſtis* falling a way as I expected, I found it adhered to the *Dartos*, next the ſuture only, which I ſeparated, and preſently fill'd the Wound with Pledgits of fine Flax, dip'd in *Colebatche*'s Solution, then made my Bandage, and left him as eaſie as poſſible; about an hour or two after the Operation we were alarm'd with a Flux of Blood, from one of thoſe large Capillaries, repreſented in the Figure, (which I ſuppoſe happen'd not to be ſo well covered with the Stiptick as it ought) which Flux, though not great, gave

us freſh Trouble, and obliged us to remove all the Dreſſings, and apply a freſh Stiptick, after which it bled no more. I removed the dreſſings the ſecond Day, and on that part of the *Scrotum* that had ſuffer'd ſuch a vaſt Extention (and by the Exciſion of the Tumour being deprived of its Nouriſhment) I found a ſlight Mortification (which indeed was nothing but what I expected) I then proceeded with Fomentations, and warm Digeſtives. The Patient in the mean time obſerving the Rules of Diet, with a great deal of Regularity, and for the ſupport of his Spirits drinking plentifully of the *Decoctum Album*, made him a little Cordial with ſtrong Cinamon-water, and taking every Night a gentle Paregorick Draught, in ſhort time the *Eſchars* ſeparated. The Wound incarn'd ſo faſt as is hardly credible. The remaining *Scrotum* contracted to very near its natural Bigneſs, and three Weeks after the Operation he return'd home in perfect Health.

N. B. Upon Diſſecting the *Teſtis* we found nothing in't, but a vaſt quantity of extravaſated Semen, from whence we may call it *Hernia Seminalis*; from its fleſhy Adheſion to the *Dartos*, we may call it *Hernia Carnoſa*: And from the vaſt quantity of watery Humour contain'd in the *Scrotum*, *Hernia Aquoſa*; theſe three put together will make a rare rumbling Name, which if you'll pleaſe to help me out with, you'll very much oblige,

Your humble Servant,

H. Cozens.

Mrs. Jeſſop's *Caſe of* Eaſt Bradenham.

ON the Eleventh of *November* 1701, Mrs. *Jeſſop* was taken with a total Suppreſſion of Urine, ſhe had all the Remedies that could be thought of by Dr. *Howman*, Dr. *Ellis*, and my ſelf put in Practice, but fruitleſs, and amongſt the reſt ſhe took two Bottles of the famous *Tipping's* Liquor, but to no more purpoſe than the reſt, but at laſt: after a ten Days Suppreſſion ſhe was relieved by the uſe of a Bath, and made Urine again very freely for two Days, and Nights, then ſtop'd again five Days, but upon uſing the Bath, was relieved again, and made Urine plentifully three Days, then it ſtop'd again, three Days after which ſhe had a dreadful Convulſion, 48 Hours after another, 24 Hours after that a third, and 30 Hours after, the fourth Fit put a period to her Life.

During all this Sickneſs (nor before that I can hear of) ſhe made no complaints of the left Kidney, neither was the pain on the Right, very burdenſome, unleſs it were the firſt 24 Hours, and again upon the ſecond Suppreſſion of Urine, at both which times it was very Sharp.

Before ſhe had been ill ten Days ſhe was ſenſible it would be her Death, and made me promiſe to open her, and directed me to the place where I ſhould find the Stone, which was near the right Huckle Bone, within three Inches of the Bladder; I accordingly Diſſected her the Morning after ſhe died, and in the left Kidney I found a Stone, that weigh'd one Dram two Scruples, of a chalkey Subſtance: It was faſt fix'd in the Mouth of the Ureter, and the Kidney waſted away, and ſhrivel'd up like an empty Purſe, and doubtleſs had been uſeleſs many Years. The right Kidney I found four times as big as it ought to be, full of a Mucilaginous Matter, and the fleſhy part perfectly Rotten, and (as I ſaid before) within three Inches of the Bladder I found the Stone ſhe complain'd of; exactly of the Colour and Shape of a Dateſtone that weigh'd ten Grains.

In the Gall-Bladder I found one and twenty Stones, three of which were as big as ſmall Nutmegs, and each weigh'd half a Dram, the other eighteen being ſmaller, were weigh'd together, and they weigh'd one Dram one Scruple; theſe Stones of different Sizes and ſtrange odd Shapes, but ſo exactly poliſhed, that Art can't exceed it. There was nothing of choler in the Gall, but about half a Pint of a Whey-colour'd thin Mucilaginous Liquor; the Liver was extreamly ſwell'd, but not much diſcolour'd; the Spleen was alſo ſwell'd, but not

not Scirrhous, and the Meſentary without any manner of Fault.

The Caſe of a Young Maid of Eighteen Years of Age, who had a Suppreſſion of Urine.

JUNE the 28th, 1705, I was ſent for to *Elmham* in *Norfolk*, to a young Maid of 18 Years of Age, that had not made a Spoonful of Urine in 48 Hours, and was in as much Torture as a Woman in Travel.

Going to put up a Catheter, I found the *Hymen* impervious, and driven out beyond the *Labia Pudendi*, as big as a large Gooſe's Egg, and the preſſure ſo great: That the *Meatus Urinarius* would ſcarce admit of the Inſtrument; at laſt with great difficulty I diſcharged near five Pints of Urine, which gave her a great deal of Eaſe: But her Body ſtill remaining as big and as hard as a Woman's half gone with Child, I believed the ſtopage of Urine to proceed from no other Cauſe, but the Extention of the *Vagina*, ſo I told her Mother and Relations, (who knew nothing of the Swelling till the Day before they ſent for me) that unleſs care was taken of that Swelling, (as they call'd it) ſhe muſt never expect to make Urine again without the help of an Inſtrument. The good Woman asked me what ſort of Swelling it was; (they having never ſeen nor heard of any ſuch thing, could not conceive what was the Occaſion on't, which fill'd them full of dreadful Apprehenſions, about having the Operation perform'd: I explain'd it to them in Terms as ſuitable to their Capacities, as the Caſe would bear, and told them that the outward Orifice of the Womb, was perfectly cloſed from her Birth, ſo that when ſhe came of Age, that the Womb according to the Cuſtom of Women, diſcharged it ſelf from the Courſes, they fell into the Neck of the Womb, and were there retain'd, ſo that the Tumour had been gradually increaſing ev'e ſince, according to the quantity of her Monthly Evacuations: I then ask'd her how long ſhe had been ſenſible of this Swelling, ſhe own'd it had been encreaſing near two Years, but being no trouble (till of late) ſhe took no notice on't, hoping in time ſhe ſhould be as other Women. This Relation of the Girl's, cauſed them to give the more Credit, to my Opinion, ſo they preſently agreed to bring her to *Swaſham* the next Day, and as I ſaid before, ſo it proved, for ſhe made not one drop of Urine, from the time I left her, till ſhe came to *Swaſham*, ſo with the Catheter as before, I relieved her of about four Pints, and then prepared for the other Operation. After all things were ready, I placed her in a convenient Poſture, and made an Inciſion from near the *Meatus Urinarius*, to the *Perinæum*, and diſcharg'd near eight Pounds of extravaſated Blood, very Black, but not Fætid; I dreſſed her up with proper Pledgets to keep the Lips of the Wound from Cloſing, and in a Week's time reſtor'd her to perfect Health, and perfect Woman.

To the Author of the Bibliotheca Anatomica.

SIR,

A Poor Woman of *Marham* in *Norfolk*, about ſix Months gone with Child, came to me for Advice. Her Caſe was ſo very uncommon that perhaps it may be thought worthy of a Place, in the *Bibliotheca Anatomica*, or the *Appendix* to it, if it comes not too late.

She told me, that of her firſt Child, ſhe had a very difficult Labour, and ſhe fear'd her Midwife had not done her Juſtice, for now ſhe was in ſuch a Condition, as ſhe believ'd no Woman but her ſelf was ever in; for her Belly with the Child, hung (as ſhe walk'd half way down her Thighs, and when ſhe ſate will nigh cover'd them; and that was not all; for at the bottom of her Belly, was a ſore place (as ſhe call'd it) that ſhe fear'd her Bowels would fall to the Ground, and beg'd of me to aſſiſt her. When I came to inſpect the Parts, I found (to my great ſurpriſe) a Laceration of the *Peritonæum*, and alſo of the Muſcles of the *Abdomen*, they opening to the right and left, from the Navil to the *Pubis*, as if the *Linea Alba*, had been divided by Inciſion,

ſo that nothing prevented the *Uterus*, with the contain'd *Fœtus*, from falling clear out her Body; but the Skin, and *Membrana Carnoſa* of the *Abdomen*; and at the lower part of this vaſtly extended Skin, near the *Pubis*, was the aforeſaid ſore Place, which was a Mortification, as broad as a Man's Hand, with a thick *Eſchar* accompanied with ſome Pain, and diſcharge of Fætid ſanious Matter, all which was occaſion'd from want of natural Heat, which the parts were depriv'd of, by being ſo preternaturally extended with the conſtant weight of the *Fœtus*, *&c.*

I placed her in a convenient Poſture, in order to reduce the *Uterus* into it's proper place, which I effected with the greateſt eaſe imaginable; but then there was ſo much Skin to ſpare, that I knew not what to do with it, from which I no ſooner removed my Hand, but upon the leaſt Motion of the Woman, the *Uterus* immediately followed into the Skin as before.

The danger ſhe was in from the Mortification, ſhe had no Notion of; neither was ſhe under any Apprehenſions about it, but I found her Deſign of coming to me, was to engage me in a Promiſe, to aſſiſt her in her Labour, ſhe fearing (and not without a great deal of Reaſon) that it would be accompanied with the greateſt Difficulties, if not prove Fatal, eſpecially if under no better care than the Midwife ſhe lived near: I promiſed in caſe of Neceſſity, to aſſiſt her, and order'd (for the better retaining the *Uterus in ſitu*) a Bandage broad enough to receive all the extended Parts, and to be ſupported with ſtoops over each Shoulder: The Ulcer I caus'd to be dreſs'd every Day, with a Plaiſter of *Baſilicon*, and without the Application of any other Medicine; (the farther extention of the *Abdomen* being prevented, by the Bandage, and the Parts kept warm) the Eſchar ſoon digeſted, the Ulcer incarn'd, and in a ſhort time cicatriſed, and at the end of nine Months, ſhe was (without any manner of Difficulty) deliver'd of a hearty ſtrong Child, wanting no aſſiſtance, but what three or four Neighbours afforded; ſhe recover'd much better than of her former Child, and ſoon after came to give me this account of her Succeſs: She continues very Healthful, only oblig'd to wear a ſtrict Bandage; for upon the leaſt default, ſhe has the ſame inconvenience from the *Viſcera*, as ſhe had when Pregnant, for which there ſeems to be no Remedy, her Poverty expoſing her to all ſorts of ſervile Labour.

An Account of ſeveral Wounds and Diſeaſes, with remarkable Caſes and Cures on ſeveral Perſons. From G. Bidloo.

Of the Nerves.

WHAT has hitherto been urged concerning the Animal Spirits, and their Paſſage through the Nerves, I acknowledge my ſelf not reconciled to; and that after an indefatigable Diligence, and repeated Experiments, I am not ſo happy as to diſcover any ſure and unqueſtionable Appearances of the Matter aſſerted. But however, as a Satisfaction and Compliance to my Pupils and ſome worthy Phyſicians, I enter'd *Anno* 1697 upon the following Diſquiſitions in Preſence of a learned and grave Aſſembly.

I. Upon making repeated Ligatures on the large Femoral Nerves in a living Dog, ſometimes near the *Inguina*, and at other Times near the Knees, I obſerv'd the Intumeſcence to be always below the Ligatures; but the contrary happen'd upon tying the ſmall

ſmall Arteries that were beſtow'd on the Membranes of the Nerves.

II. About an Hour or two after I looſen'd the Ligature, the Nerve, together with its Blood-veſſels, recover'd their priſtine State.

III. Upon the ſlitting or cutting a Nerve in two, that *Succus* which is pronounced peculiar to this Organ, was ſo far ſpontaneouſly from flowing out at either Extremity, that it could not be expreſs'd even by Force.

IV. Upon dividing a Nerve, either according to its Length, Breadth, or a-croſs, there did not diſtil from it ſo much *Succus* as to leave the leaſt Speck upon a Piece of white Paper.

V. A Nerve punctur'd or cauteriz'd, upon Separation of its Eſchar has not the leaſt Appearance of a Fluid.

In large Cutaneous Ulcers, and ſome Sorts of Scabs, there is very often obſerv'd a *Stillicidium* or Gleet, which indeed is no more than what appears upon the Application of *Cantharides*; and this very probably flows from the Blood-Veſſels and Lympheducts, and not from the Nerves and Tendons.

The Subſtance of the Nerves (ſays our Author) appears to be nothing more than indefinite tenſile Filaments diſtributed thro' the whole Animal Oeconomy, whoſe Sides are co-adapted without any Interſtices, being ſheath'd in proper Membranes, and diſtinguiſh'd into ſeveral *Faſciculi*. Theſe Filaments upon Maceration, Putrefaction, or the like, loſe their Contiguity, and recede one from the other, whence there is an Appearance of ſome tranſverſe *Fibrillæ*; but whether theſe were ſmall Ligaments, which ſeems moſt probable, or the torn Membranes of ſome of the Faſcicles, I could not diſcover. I ſhould have obſerv'd, that I never found any Lymphaticks within, but always without theſe Conduits, diſpers'd over the *Superficies* of their Coats; nor have I ever ſeen any Valves in the Faſcicles of the Nerves: Wherefore this Argument of theirs is invalid who maintain, That when a Nerve is divid'd, and Mercury effuſed on the *Superficies* of its *Tubes*, it will not permeate it. Therefore (ſay they) its evident that the Obſtacles are Valves. Now, the *Stamina* of the Nerves are ſolid, not tubous Bodies, nor are they ſeparated by Interſtices: 'Tis for this Reaſon that Mercury won't permeate their Superficies, nay, though you were to force it with your Finger. Hence I gather, that its impoſſible to demonſtrate the Animal Spirits, and that their Influx into the Muſcles is not materially neceſſary to voluntary Motion. It's poſſible for a Muſcle to be put in Motion from its own Diſpoſition of Parts, and the Motion and Action of the Blood upon its Nervous and Tendinous Fibres; as I have elſewhere ſufficiently prov'd.

Now that thin, and ſometimes viſcid Gleet, which we ſee ouze from a wounded Tendon or Nerve, is chiefly to be imputed to the Lymphaticks, and inhiant Mouths of the Arteries, which appear like ſo many Spots in the Wound.

Of Hydatides.

There are ſeveral Kinds of *Hydatides*, but eaſily diſtinguiſh'd: 1. From a Dilatation of the Lymphaticks in the Space between the Valves. This Diſtention, when the Veſſel is obſtructed in its upper Part, is produced ſooner or later, according to the Force the contain'd Liquor is impell'd with from the Glands: That the Diſtention happens between the Valves, and not in their Region, appears from the Diſpoſition and Structure of the Veſſel it ſelf; for the Sides of the Valves are thus tied in order to prevent their receding one from the other, and give no Opportunity for Diſtention in this Place. 2. Though the Lympheducts in general may proceed *Ab Anguſto in Anguſtum*; yet in ſeveral Places between the Valves with reſpect to their Latitude they have different Dimenſions, and the Valves themſelves with regard to Longitude are diſtant one from the other in a different Dimenſion, which may be prov'd by an Injection of Mercury, or any other Liquid; nay, if the Mercury, or whatever elſe injected, break through, either by its Weight or Force of Infuſion, the Veſſel will never burſt in the Region of the Valves. That the Lymphaticks may, and in what Manner, be obſtructed, I thus endeavour to prove:

'Tis evident both from living and defunct Animals, that where a Lymphatick is more than ordinary diſtended, there it is generally obſtructed; and upon Preſſure of the diſtended Part you may eaſily diſcover *Hydatides* of different Magnitudes, ſuch as are found in the Lips, Eye-Lids, *&c.* Now, whenever an Obſtruction happens juſt where the Veſſel emerges from the Gland, they are not ſo eaſily diſcover'd; for the Veſſel being now render'd uſeleſs, its Sides, for want of its accuſtom'd Fluid, fall together, ſo that it has no more the Appearance of a Veſſel, that is, in its upper Part, but of a Membrane or Ligament. On the other Hand, if the Obſtruction happens in a Part more remote from the Gland, then the *Series* of *Hydatides* is very demonſtrable. The ſecond Kind of *Hydatides* ſpring from thoſe Glands where the Arteries terminate, and the Veins have their Origine. (*Vid. Diſput. Phyſiolog. Anat. meam Quartam.*)

'Tis to be obſerv'd, That theſe and the like *Hydatides* admit of no Cure but a Chirurgical one, *viz.* by Compreſſion, Ligature, and Extirpation by Knife or Fire: Cauſticks are not ſafe. On the contrary, thoſe that may be perceived at the Touch, be they never ſo big, may without the leaſt Danger be extirpated. *Hydatides* which poſſeſs a Glandulous *Viſcus*, ſuch as the Liver, Spleen, *&c.* are incurable.

The Figure of *Hydatides* every one knows to be generally round or ſpherical.

There is another Kind of *Hydatides* worth Obſervation, a Diſeaſe very frequent in the Inſide of the Lips of Scorbutick Perſons. In the Beginning they are livid, indolent, ſoon flag, and become a whitiſh Ulcer, which, if not taken Care of, will terminate in a Gangreen of the ſoft Parts, and a *Caries* of the Bones, and ſometimes prove the Death of the Patient.

Their Method of Cure is this: The Part muſt be ſcarrified 'till a good Quantity of pure Blood follows, and afterwards waſh'd with a Solution of *Cypreſs-Vitriol*, which muſt be repeated twice or thrice a Day: As for Univerſals, you may uſe Volatiles. If the Malady increaſes, an Injection of the Juice of Celandine would be very convenient, and a *Fotus* of fragrant Herbs and Seeds. Avoid the Uſe of Spirit of Wine, which will make Callous Lips; Myrrh, Aloes, *&c.* are alſo to be rejected.

This Kind of Swellings, common to the Lips and Cheeks, is vulgarly, but without Reaſon, called a *Cancer*; for a Cancer is a Diſeaſe of the Conglomerate Glands, and not the Lymphaticks.

Of the Phlyctæna.

Phlyctænæ are ſmall Elevations between the *Cuticula* and *Cutis*: They ariſe in ſeveral Parts of the Body; and thoſe of the Limbs differ from thoſe of the Eyes. The *Phlyctænæ* of the Limbs appear in Form of Pellucid Veſicles, fill'd ſometimes with a yellowiſh, and ſometimes whitiſh Water, breaking out on a ſudden in ſeveral Places with Itchings; and if not open'd they dry, and have very much the Face of an Eating-Ulcer, or Squammous *Herpes*. The *Phlyctæna* of the Eye is ſeated either in the *Adnata* or *Cornea*, and does not ſhew it ſelf in Form of a Veſicle: It contains no Liquor, and differs in theſe Circumſtances from thoſe of the Limbs, in that it always breaks out ſingly, ſlowly, and without any *Pruritus* or Itching, and if not cured has the Appearance of a dried and incruſted Ulcer. The *Phlyctæna* of the Limbs, as the Legs, Hands, and Feet, elevate the *Cuticula* in ſeveral Veſicular Tubercles, which being cut off, and the Seroſity dried up, there are offer'd to View ſeveral Aſperities and ſmall Eminencies, more or leſs, according as the Glands or *Papillæ Pyramidales* are more or leſs affected. This Seroſity ſeldom continues above four or five Days, in which Time the Part either conſolidates, or degenerates into a ſcabby Ulcer, with the Induration, Inflammation, and Excoriation, of the Circumjacent Parts. When theſe Ulcers grow inveterate, it often happens that a foul Excreſcence throws it ſelf out, and the Lips of the Ulcers grow here and there callous. Hence we may ſee that the *Phlyctæna* of the Limbs affects the cutaneous Glands and *Papillæ Pyramidales*, and that of the Eye the Artery only.

That the Artey in a *Phlyctæna* of the Eye is chiefly affected, I preſume may be confirm'd

firm'd by the following Reaſons: Firſt, 'tis contrary both to Reaſon and Experience, that this red Exuberance on the *Cornea* or *Adnata* ſhould riſe from the Vein, ſince that returns the Blood from the Coat; neither is it a part of the Vein, for it has no *Pellicle*: Beſides, were it Venous Blood thrown out, it would not be of ſo florid a Red, as it is all along, but of a dark brown Colour; neither would it encreaſe momentarily as a *Phlyctæna* does: For the Blood has no retrogradation in the Veins. Secondly, That it is not of the Lymphatick kind, is evident from its Matter, Origine, *&c.* and the Fabrick and Uſe of the Lymphaticks themſelves. Thirdly, That it is owing to an indiſpoſition of the Nerves, no Anatomiſt can ever imagine. Fourthly, 'Tis impoſſible to prove it to be an affect of the Coats of the Eye, becauſe they ſuffer only from the *Phlyctæna's* preſſing upon them; for it's evident they may be ſeparated without lacerating the Coats. Fifthly, Nor can the Glands of the Eye be in fault, ſince it is ſeated far enough from them. Sixthly, That the *Ductus Lachrymalis* can't produce this effect needs no proof; for it don't diſcharge Blood but a Limpid Water: Hence we readily conclude, that the Artery is the efficient Cauſe of this Diſtemper in the Eye. This *Phlyctæna* can't be ſuppos'd to be an incipient Inflammation; for ſince in that, one or more Branches of the Artery are obſtructed, but in this they are open'd. Thus much of the difference, riſe and progreſs of this Diſtemper; we ſhall now briefly touch upon its Cure. In the Cure of the *Cutaneous Phlyctæna*, the Patient muſt obſerve a Lenient Diet: The Topicks are to be Anodynes and Deſiccatives, ſuch as diluted Wine, Solutions of *Opium*, *Ung. Alb. Camph. Diapomph. Aq. Litharg. Aq. Plantag.* &c. Plaiſters and Unguents in general are to be avoided. If it degenerates into an Ulcer, it muſt be treated as one; in which Caſe Sulphurs and Mercurials taken, mix'd or ſingle, are very profitable; If it be turn'd into Scabs, it is to be cur'd as one. In the Cure of a *Phlyctæna Oculi*, all things that put the Blood in too great a Motion, are to be avoided, as alſo Oil, Fat, *&c.* You muſt not attempt to bring it to ſuppuration, becauſe the Matter impact in it never degenerates into *Pus*; therefore ſuppurating Cataplaſms, Fomentations, *&c.* are of no uſe: The Remedies to be applyed in this Caſe, are to be ſuch (if poſſible) as dry with little or no Incruſtation, as *Gummi Arabicum*, *Gypſum*, *Saracocolla*, *Cerussa*, &c. but you muſt take care to reduce them into an impalpable Powder; theſe in time will gently dry and cicatrize the Ulcer.

An extraordinary Caſe of extracting an extraneous Body out of a Wound.

I Shall begin with a very remarkable Caſe of one *John Hendrick* a *Dutchman*, Aged 35; he was a Marine on board a Convoy-ſhip call'd the *Utrecht*, commanded by Captain *Dekker*, Anno 1690. On the 10th of *July*, in an Engagement off Cape *La Hogue*, between the *French* and Confederate Fleets, this Perſon was wounded by a ſmall Shot, in the upper part of the left Fore-Arm near the Cubit, and at the ſame time received two large Wounds on his left Breaſt by the Splinters that flew about. It happen'd that the ſame piece of Cannon wounded ſeveral others, which gave the Surgeons Suſpicion, (as they afterwards found) that it was charg'd not only with a ſingle Ball; but a Bag alſo ſtuft with Small-ſhot, and bits of old Iron: But however our Patient thus wounded, was, with the reſt of the wounded Men, the next Day carry'd to an Hoſpital in *Port Duyns*; where, in a Month's time his Wounds were heal'd, upon which he came to *London*; however he being from his Infancy us'd to the Sea, and having made ſeveral Voyages both to the *Eaſt* and *Weſt-Indies*, had no long ſtay here, but took a Reſolution to go in the *Scots* Service: Upon his return ſome Years after, he complain'd of a prodigious Pain about his Loins, and upon viewing it, there appear'd a Tumour near the *Ilia*, which was open'd, and diſcharged a quantity of *Ichore*. The neighbouring Parts were mightily inflamed and indurated, and in ſhort it became Fiſtulous; the Orifice of the Ulcer was ſometimes open, and ſometimes clos'd by Proud-fleſh, diſcharging ſometimes an Ichorous Gleet, and at other times

nothing at all: Under theſe calamitous Circumſtances, he apply'd himſelf to ſeveral Phyſicians and Surgeons but all to little or no purpoſe. By this time his Affliction encreaſing, and his Patience worn out, he came to my Collegue D. *Dekkers*, who after examining the Caſe, ſent him to me.

Upon the Patient's telling me this Story, I made a ſtrict examination, and found a fiſtulous Ulcer, whoſe Orifice was ſtop'd by Proud-fleſh, its Lips Livid, and the Skin mightily inflamed; It run between the *Spina Ilii*, and tranſverſe proceſs of the laſt *Vertebra* of the Loyns, on the left Side: The conterminous Parts were much indurated; upon paſſing my Probe I could feel ſomething hard, which I judg'd to be part of a proceſs of one of the *Vertebræ*; wherefore I dilated the Orifice with a Spunge-Tent. About five Days after, the Patient fell ill of a Feaver, and what with that, together with the extream Pains of his Wounds, he refus'd to let me dreſs him any longer; but however, with much a do, I prevail'd upon him to let me take the *Fungus* down; which I did, and having made way for my Forceps, I endeavoured, with them, to extract that Subſtance (which appear'd now blackiſh) I took for a Bone, but this my attempt was fruitleſs, for it ſtuck very faſt; therefore I dilated with my Probe-ſciſſors about a Thumb's-breadth, and deferred the Extraction of the Body till the next Day, which was about that Day 11 Years ſince he received the Wound in his Breaſt: In paſſing my largeſt Forceps I laid faſt hold on the hard Subſtance, and drew it forth, which (to the great Aſtoniſhment of the by-Standers) appear'd not to be Bone, but a piece of Iron, about 3 Inches long, and one broad, and rough at each end; afterwards I gently paſs'd my Finger to feell whether I could find any more extraneous Bodies, but perceiving none, I ſlightly filled the Wound with Pledgets dip'd in *Ol. Hyperic. & Ung. digeſt.* warm'd, waſhing the Lips with a Solution of *Vitriol. Cyprin.* and over all apply'd *Emp. Defens. Vigon.* by which means (and the aſſiſtance of God) I conſolidated the Wound, and made a firm and even Cicatrice.

A ſhort Account, with an extraordinary Caſe, of Varices.

IN the Year 1701, at the latter end of *April*, came to me one *John Roberts* about 41 Years of Age; he was a Man of a ſpare Habit of Body, ſupported by Crutches, who through exceſſive Pain rather crawl'd than walk'd; and every ſtep he took obliged him to cry out. When he had unty'd his Stocking, I ſaw on the outſide of his Knee three large *Varices* of a Livid Complexion, and ſo diſtended with Blood, that I thought they would have burſt the Skin: I inquired then into their Cauſe, Riſe, Standing, and how they alter'd from time to time; and found by his account that when he was about 8 Years of Age, there was a red Puſtle as big as a large Pea, broke out on his Knee, which, tho' it dayly encreaſed, he neglected 'till it came to the bigneſs of a Pigeon's Egg, and then came to *Utrecht* and ſhew'd it to a *French* Surgeon, who after chiding him for his Neglect, undertook the Cure, which was as follows: He paſs'd a ſtrong Ligature round the *Baſis* of the Tumour, and with a large Inciſion-knife cut it off, but left a ſordid Ulcer behind, which another Surgeon after a great deal of Pains and long time ſlightly Cicatriz'd. This notwithſtanding with two other Tumours of the ſame kind encreas'd every Day, and the poor Man's Caſe grew from bad to worſe: He ſuſpected the Cauſe to proceed from carrying heavy Burdens, which he had been uſed to from his Youth: He afterwards liv'd at *Leyden*, and carry'd Milk about the Streets, till at length one of the *Varices* was diſtended to ſuch a Degree, that it was as big as a Child's Head, and look'd as if it were mortifying; for the *Cutis* appear'd black in ſeveral Places, and the *Cuticula* pill'd off it: Whereupon, being often feaveriſh, and thro' loſs of ſtrength ſcarce able to bear Pain any longer, he deſired the Aſſiſtance of *Chriſtian a Steeneveld* a late famous Surgeon, who in conſultation with D. *H. Ooſterdyk Schacht*, attempted to cure that which hung down upon the *Tibia* by Inciſion;

ſion; preſſing therefore a great quantity of Blood from the *Varix*; he treated the Wound according to Art, and after having deterg'd it, he endeavour'd to cicatrize it, but to no purpoſe; for the *Varix* was neither ſuppreſs'd, nor taken away, but on the contrary protruded a-new, and look'd like a *Sarcoma* or *Hyperſarcotick* Ulcer.

After he had try'd the palliative means of ſeveral Phyſicians and Surgeons, and found with them, that the *Varices* grew bigger and bigger, and his Pains encreas'd, even to the loſs of the uſe of his Knee, he then came and conſulted me: Whereupon, together with ſome Phyſicians and Surgeons whom he had made Application to, I took care of him, though ſeveral of them caution'd by the Opinion of the Ancients, pronounced ſuch *Varices* incurable, and therefore not to be meddled with. However, notwithſtanding that, I enter'd upon the difficult Task, reſolving to handle this *Noli me tangere* with the greateſt Precaution and Prudence I was maſter of.

Upon a ſtrict Examen of theſe *Varices*, and weighing all their Circumſtances, I began with one about the bigneſs of one's Fiſt, below the Knee: Becauſe it lay the Faireſt, and afforded the greateſt hopes of Succeſs, it being free from the Tendons and Ligaments, and having no community with the other two; and farther, I being well aſſur'd that upon a prudent and circumſpect management the Patient could not poſſibly be worſe. Take the method as follows; Firſt, after having preſcribed a due *Regimen*, I apply'd over the whole Knee *Emp. Defens. Vigon.* to prevent Inflammation, which was perforated according to the Circumſcription of the *Varix*, where I apply'd Pledgets, arm'd with *Butyr. Antimon.* and over them a Bolſter dip'd in *Aq. Litharg.* with a moderate Bandage: A few Hours after I viſited my Patient again, and found him complaining of intolerable Pain, and that the whole *Apparatus* was bloody, the Bandage looſen'd part of the Tumour incruſted, and part of it in clefts; upon which I gently preſs'd out what Blood I could, and dreſs'd it up as before, rubbing the neighbouring Parts with *Ung. Alb. Camph.* All this day the Patient did not ſtir himſelf in his Bed. The next day the Dreſſings look'd bloody, but removing them I found the *Varix* blackiſh, and cruſted over, the neighbouring Parts not corroded, and the Patient pretty well at Eaſe; Wherefore I continued my Method 'till the fifth Day, when on my indeavouring to looſen the Eſchar with my *Spatula*; there followed a great Flux of Blood, which with my Styptick I ſoon ſuppreſſed, and did not meddle with it for two Days, only ſo far as gradually to relax the Bandage: But upon the third I carefully took off the Dreſſings, and found a hard and black Cruſt, which I endeavoured to increaſe, and that with ſuch Succeſs, that in a Fortnight's time, with ſcarrifying the Eſchar, and following the aforeſaid Method, I entirely ſeparated it without any *Hæmorrhage* at all. The Ulcer being cleans'd, I proceeded to incarn, and in a ſhort time happily cicatriz'd it, with the perfect uſe of the Joynt.

A *Varix* is generally defined to be the dilatation of a Vein ariſing (according to the Ancients) from Melancholick, black concrete Blood, (and as Moderns ſay) from a craſs and terreſtrious Blood; the firſt again, ſuppoſe it to proceed from an Obſtruction of the Spleen; the latter from a Relaxation of the Valves of the Vein, aſſerting that an *Aneuriſm* is a preternatural Diſtention of the Artery, as a *Varix* is of the Vein; but how barbarous a Deſcription is this, enough to lead young Practitioners in Surgery into Error! Though ſome indeed add that the Vein is not ſimply dilated, but ſomewhat contorted, and now and then forms it ſelf into blackiſh Knots; but this is as trivial as the other, and falls vaſtly ſhort of the Deſcription of a true *Varix*, rather confounding it with the *Hæmorrhoids*, and ſeveral other Diſtempers and Symptoms of theſe Veins and Arteries. Suppoſe then the Vein to be dilated in a *Varix* there is ſtill ſomething elſe in it Morbifick, beſides Dilatation, which diſtinguiſhes it from other Diſtempers, and alters its Name and Method of Cure.

One *Varix* differs from another only in Magnitude, Place and Time, *&c.*

An *Aneuriſm* is of the ſame Colour with the reſt of the Skin, a *Varix* is not.

An *Aneuriſm* is never coherent with the Skin, a *Varix* always is.

An *Aneuriſm* never ſucceeds upon Aperſion, a *Varix* always does.

Of the Hypopyon, *or Purulent Eye, with a remarkable Caſe.*

Hypopyon is a Collection of the Lymphatick Liquor of the Eye, from an internal Cauſe, between its Membranes turn'd into *Pus*, appearing through the *Cornea*, ſometimes with a large, and ſometimes leſſer Protruſion of this Coat, and neighbouring Membranes. If it begins by Degrees, the Pain is not intenſe; but if on a ſudden, very ſevere: In the firſt Caſe there is a Dimneſs only; in the latter an entire Abolition of Sight, an Inflammation, and Intumeſcence of the external Parts of the Eye-Fever, and what not. This Affect is never cured without Abolition of Sight, which, beſides the Suggeſtions of Reaſon, frequent Practice has confirmed to me; for 'tis evident that in Wounds near the Eye, Matter may work it ſelf into the Bulb of the Eye.

Of the *Hypopyon* take this as a remarkable Caſe: Some Years ago a late *Burgo-Maſter* of *Amſterdam* carried me to viſit a *Vintner's* Son, living at the Place commonly called *De Gelderſche Kaay*, who labour'd under a large *Hypopyon.* His Parents ſaid it happened upon inſupportable Pains and Inflammations of the External Parts of the Eye, and increaſed every Day, at firſt with a Dimneſs, and then an Abolition of Sight, for which he was bled, purg'd, and had ſeveral Cataplaſms applied to his Eye: And I farther underſtood by a Surgeon I cauſed to be ſent for, they were ſuppurative ones, as, *Ex Radicibus Liliorum Ungu. Baſil. Far. Lin. & fruct. Ficuum, &c.* The Patient a little while before the Cataplaſm was applied, could diſcern the Head of a Pin from its Point, but the *Cornea* was now ſo precluded, that he could not ſee at all, and through Extremity of Pain behav'd himſelf like a Mad-Man. In the midſt of theſe Agonies, I told his Parents, there was no preſerving the Sight without coming to a Manual Operation; and that without a ſpeedy Performance, the Patient would endanger his Life. The Surgeon was againſt the Operation, urging before them all, That the Eye was a very tender Part, and therefore would admit of no Inciſion. Upon that I made Anſwer, It was worſe Practice in him to promote Suppuration. The next Day the Parents agreeing to have it open'd, I told them, they muſt only expect the Child's Life and Form of the Eye to be preſerv'd, but deſpair of the Sight; ſince the Eyes could by no Means be cloſed for ſeveral Days, and there flowed from the Wound a Quantity of *Pus* and Limpid Matter. I applied over the whole Eye the following Medicament:

℞ *Medull. Pomor. Putreſc.* ℥ ij. *Croci Brit.* ℈ j. *Laud. Opiat.* gr. v. *ciqu. Hord. mic. pan alb. qſ. pro Cataplaſmate inter Linteamina tepide Oculo adhibend.*

The ſame Day I inſpected the Eye thrice, and repeated the aforeſaid Cataplaſm: After having gently preſs'd the Matter out, I laid on Bolſters dip'd in *Lac. Virg.* warm'd, of which this is the Form:

℞ *Aceti acidiſs.* ℔ j. *coquat. cum* ℥ iv. *Litharge. aur. colat. adde Rad. Rub. Tinct.* ℥ ij. *Sacch. Saturn.* ℥ j. *Camp.* gr. v. *ebulliant horæ quadrant, filtret, conſervetur in uſum.*

In the Evening the Pain abated, and the Patient was very eaſy. I repeated the ſame Medicines, and the next Morning found every Thing chang'd for the better; therefore I continually ply'd him with Medicines 'till the next Evening, when inſtead of diſturbing the Family with Cries, he chear'd them up with Smiles. When the Parents found the Patient at eaſe, and his Eye every Hour receding into its Orbit, they flatter'd themſelves with the Hopes of recovering his Sight: But the Matter being all expell'd, and the Ulcer conſolidated, my Prognoſtick prov'd true, *viz.* That there would be no Deformity of the Eye, but the Loſs of Sight.

Of

Of an Excreſcence *which ſuddenly grew out of a Woman's Groin.*

In the Year 1703, in the Month of *April*, one *William Beaudox*, who practiſed Surgery at *Wormonden*, came to me with *Mary Corſzem*, a Widow about Forty ſeven Years of Age, who had brought forth Five Children, and inſtead of the laſt, *An.* 1707, *Nov.* 7. there aroſe in her Left Groin a hard Tumour, indolent, and of the ſame Colour with the Skin. At firſt it was no bigger than a Pea, but in Time equall'd a ſmall Cheſs-Nut, till at laſt it grew to the Bigneſs of an Egg. When the aforeſaid *Beaudox* on the 19th of the ſame Month was ſent for to inſpect it, hearing that it encreaſed daily, and that it would bleed Four or Five Pints a Day, could ſcarce tell what to make of it; and the Patient living about Two Miles from him, he only ordered her ſome Stypticks, and left her for Eight Days, when ſhe ſent for him again; and to his great Amazement, in that ſhort Time he found the Tumour to be Eight Inches long, and Five Diameter. About Four Days after I was conſulted in the Caſe, to my no ſmall Surprize. When I had examin'd the Matter, I told them the Danger of it; and withal, adviſed them immediately to call in ſome other Surgeons and Phyſicians, ſince Delays might prove fatal.

On the 3d of *April*, I again examin'd the Caſe with *Alderkerk* and *Beaudox*, Surgeons, and obſerved the Tumour to be apparently encreaſed; it look'd black, and was very fœtid. I made a diligent Enquiry into all the Circumſtances of this Swelling, that is, in what Manner it adher'd to the Groin, what Sort of Tumour it was, *&c.* The next Day about Seven in the Morning came *Torrenius*, *Continot*, *Alderkirk*, *Vanloo*, *Beaudox*, and ſeveral learned Phyſicians, to whom I declared my Opinion concerning this Excreſcence, and the Method I propoſed to cure it by, *viz.* That it was a Diſtention of one of the Inguinal Glands adhering to the Groin by a broad *Baſis*, though it did not penetrate the Capacity of the *Abdomen*. As to the proximate Cauſe of this ſudden Excreſcence, my Opinion was, That the Inguinal Gland (the Artery being obſtructed) ſwell'd, grew hard, and continued in that State till the Blood flowing with a greater *Impetus* reſolved the Obſtruction, and by that Means form'd this Excreſcence. Now that ſuch a large Swelling may in this Manner, and in a few Days, be produc'd, I have evidently demonſtrated and illuſtrated by Examples of the Peſtilential *Bubo*, *Fungus*, *&c.* This I back'd with another Method of treating this Tumour, *viz.* That it could not ſafely be taken away by Eſcaroticks, Inuſtion, or Inciſion; but that our chief Hopes might be placed in Ligatures. The aforeſaid Gentlemen therefore agreed with me, and gave their Aſſiſtance. After having brought the Excreſcence as far as poſſible from the *Abdomen*, I paſs'd about it in a decuſſate Form, two waxed Threads, (for Silk perhaps would be apt to cut the Skin too ſoon) to the Ends of which on both Sides the Groin I fitted a *Torcular*, for the Nut of which I took care to make a Handle, that I might upon Occaſion, by this Inſtrument, ſhaped to the *Abdomen* and Groin, ſtreighten the *Pedunculus* of the Excreſcence at Diſcretion. The Tumour was now ſupported on all Sides with Bolſters, and the Ligatures compreſs'd from Time to Time, till from the Pain we judg'd it neceſſary to deſiſt. In the Morning I found all Things ſucceed, conſidering the Time, according to my Expectation, and that the Patient could go to Stool, and make Water, without the leaſt Trouble: Therefore I made a ſtricter Ligature; but in the Evening to prevent Inflammation and Gangreen, I uſed the following Fomentation:

℞ *Herb Abſinth.* M. iij. *Scord.* M. ij. *Marjoram* M. j. *Rad. Polypod.* ℥ß, *Spikenard* ℥ ij. *Flor. Roſar. rub.* M. j. ß, *inſid. coqu. in. Vino Rhenano aut Gall. genereſ. col. Serv. in uſum addet. parum Spirit. Vini.*

On the 7th Day I perceived the Excreſcence was mightily corrupted, look'd black, and was very fetid; but the Patient ſleeping pretty well, I ſtraighten'd the Ligature again. On the 8th I perceiv'd the Patient was uneaſy in the Night, and coſtive, but made Water very often, tho' without the

leaſt Difficulty: However, by reaſon of her quick Pulſe and high Colour, which denote a Feaver, I order'd a Suppoſitory, which wrought its deſir'd Effect about Noon; and becauſe of her Drought I would have preſcrib'd ſome Potion, but ſhe ſhewing a great Averſion to Phyſick, I judg'd it more expedient to defer it, than to preſs it upon her at this Inſtant. On the 9th every Thing ſucceeding as well as I could wiſh, the Patient eating with an Appetite, I obſerv'd about the Ligatures a *Pus* from the divided Skin, which I dreſſed with a Digeſtive Ointment applied Warm. On the 10th the Patient ſlept ſound all Night, after I had taken away a great Part of the black Excreſcence. On the 11th came with me *Torrenius* and *Le Mair*, Surgeons, when I attempted, by ſtraightning the Ligatures, entirely to extirpate the Excreſcence, but ſome ſmall *Hæmorrhage* obliged me to forbear. On the 12th and 13th every Thing ſucceeded according to the Rules of Art, and I had now greater Hopes of a good Event. I affirm'd, and was not miſtaken, that we were pretty near compaſſing a Cure. On the 14th I obſerv'd that the Ligatures were circumſcrib'd with a well digeſted Ulcer, and that the *Abdomen* and Thighs were not in the leaſt altered. On the 15th, being the 12th after the Ligatures were made, *Alderkerk* in my Abſence took off the Dreſſings, together with the whole Excreſcence from the Groin, without the leaſt Effuſion of Blood; therefore in Order to deterge the Ulcer, he applied *Unguentum Mixtum*. In the Evening, to my great Satisfaction, I found my Patient very cheerful, and the Cure almoſt compleated. I deſigned the next Day to make an Anatomical Enquiry into this extirpated Excreſcence; but its *Fator* was ſo great, that I was not able to hold my Noſe over it for a Minute: But what occurr'd to my Obſervation was, that this Carnous Maſs conſiſted of one Body, that Part excepted next the *Pudenda*, which ſeemed to be divided by a *Sulcus*; whence I concluded that two or three Glands being affected might make up this great Body. On the 16th and 17th the Ulcer was ſo far deterg'd, that on the 18th the poor Wretch, being in perfect Health, went to her Relations in the Village *Voorhout*. But becauſe Mr. *Beaudox* lived nearer, we committed the cicatrizing of the Ulcer to his Care, which he managed with ſuch Succeſs, that on the 25th of *May*, it was almoſt conſolidated, being dreſſed only with dry Lint. I ſhall make no Mention of the Bandages I uſed, they being only ſuſpenſatory and retentive ones. However, I ſhall obſerve to you, that the Patient, during the whole Courſe of her Cure, took not ſo much as one Grain of Phyſick inwardly.

Of Verrucæ *or* Warts.

Not to mention the Opinion of every Author in this Caſe, I ſhall only ſay, That one defines it to be a Carnous, *Fungus*, or Wild Excreſcence, indolent, and of the ſame Colour with the Skin; ſuppoſing it to be produc'd from a Craſs Blood, ſeparated by extraordinary Heat from the whole Maſs. Another attributes its Riſe to Melancholick, *Terrene*, and Phlegmatick Humours. Some again affirm it to be productive of the *Succus Alimentaris*, which being vitiated and detained in the Pores of the Skin, at laſt throws it ſelf out between the ſolid Fibres, and ſo takes its Encreaſe. Others imagine it has its Riſe from External Injuries; as from Worms, Spiders, Dirt, Corroſive Salt, *&c.* getting into the Pores of the Skin, and vitiating the *Succus Alimentaris*. Theſe Opinions are to be rejected as meer Figments; for they confound with the *Verruca* ſeveral Carnous Tumours and Excreſcences, as the *Thymus*, *Sycoſis*, and others. That the *Verrucæ*, contrary to the Suggeſtions of Authors, appear to be an Excreſcence of the Papillar Cutaneous Nerves, is evident by a Microſcope. Since then this is a demonſtrable Truth, I ſhall endeavour to be as conciſe as I can; but in regard that the Cutaneous Glands ſometimes protrude themſelves between theſe *Papillæ*, they look like ſo many Species of *Verrucæ*. But ſince that Diſeaſe only affects the aforeſaid *Papillæ*; a *Verruca*, properly ſpeaking, is neither Carneous, nor Glandulous, but in this Caſe a mix'd Sort of Excreſcence.

As to the Palliative Cure of Warts by Induration, and the abſolute one by Exſiccation,

cation, ſo as they may fall off, I ſhall endeavour to ſhew clearly, whether this may be ſafer and ſooner effected by Medicines or Manual Operations. Although Medicines applied to the Cure of Warts in general, may likewiſe ſeem proper in particular for thoſe of the *Palpebræ*; yet I would have young Practitioners be cautious how they uſe them, and not take it as an Axiom, That Warts are uſually conſumed by Corroſive Medicines, ſuch as *Spirit. Mercur. alb. Auripigment. Turpith. Miner. Mercur. Precipitat. Ol. Sulph. per camp. Ol. Vitriol. Butyr. Antim. Arſen. Lap. infernal. Aq. Fort. &c.*

Now, Courteous Reader, with Submiſſion to better Judgments, I ſhall chiefly give you my Opinion concerning theſe Medicines: And whoever thou art, be adviſed not to apply them to Warts of the *Palpebræ*; for be they adminiſter'd with never ſo much Caution, they will fret and corrode theſe tender Parts, to the Damage of the Eye it ſelf: A ſingular Example of which I ſhall here produce before I lay down the Medicines I uſe my ſelf.

In the Year 1690, a young Lad, about Sixteen Years of Age, had upon the right ſuperior *Palpebra* near the Noſe a large *Verruca*, and ſent for a Surgeon at the *Hague*, whoſe Name, for his frequent Succeſs otherwiſe in Practice, I ſhall forbear mentioning. This Surgeon, after having made ſlight Scarifications, applied the common Cauſtick, which had not been on an Hour, but the whole Eye was extreamly painful: However, the Patient believing the Wart ought to be conſumed, and that it could not be done without ſo much or more Pain, neglected to ſend for the Surgeon, who did not come till four Hours after. Having removed the Bandages, he took Care to keep the Eye-Lids ſteady, leſt the Dreſſings ſhould give Way, and the Cauſticks ſlip off.

He had no ſooner inſpected the Eye, but the *Verruca*, and almoſt the whole *Palpebra*, together with the Temple and Cheek on that Side, appear'd ſomewhat blackiſh: Upon wiping the Part, he examined the Caſe nearer, and found the *Tunica Adnata* and *Cornea* affected with the Cauſtick: Upon which he adviſed with me concerning the Patient. At firſt I endeavour'd to mitigate the Pains and Eroſions with *Anodyne* Cataplaſms, which put a Stop to the Malady, but Life and Vigour were wanting in the mortified Parts, and afterwards there was a ſmall Slough from the *Palpebra* and *Tunica Adnata*, and the *Cornea* was condenſed, ſo that the *Papilla* or *Ligamentum Ciliare* could not be diſcern'd through it. The whole Bulb of the Eye appeared of one Colour, being very much protruded. To conclude this Relation, I ſhall ſay no more than that the Patient had his Eye left, but loſt the Sight of it; though he now and then fancied he could in ſome Meaſure diſcern the Light.

As to the Medicines I generally make uſe of my ſelf, they are Emollients and gentle Deſiccants; the former are in order to render the Warts fit for Extirpation, and the latter for their Conſolidation: Thus have I us'd with good Succeſs *Emplaſt. de Mucilag. Menſ. Muliebr. cum ſputo mixto, ceraque abdact. cum Sandrach, &c.* I know by Experence, that the Juice of Beech or Oak won't touch this Affect; for if you mix with this Juice Ink or Gall in order to deſtroy the Wart, both the Surgeon and Patient run a great Risk; but when they are mollified, they may be ſafely rooted out. But by the Way, I ſhall only add, That a *Verruca* is more effectually taken away by a Chirurgical Operation than any Medicament whatſoever, which Operation is threefold, *viz.* Ligature, Exciſion, and Inuſtion.

A CHIRURGICAL *DISPENSATORY,*

SHEWING

The manner of chooſing, and the Preparation of ſuch Medicines as are moſt neceſſary for Surgeons.

THE beſt Method of curing Wounds proves unſucceſsful, when ſuch Remedies are wanting as are proper for the Diſeaſe: It is therefore expedient that a Surgeon be skill'd in preparing Medicines, in order to make Compoſitions, of the effect of which, he may be well aſſur'd; and if he has the good fortune to find them already made, he may always reflect more judiciouſly upon their Operations, when he knows of what they conſiſt.

Remedies for Contuſions.

IN order to reduce into the Veſſels Blood when extravaſated under the Skin, it is requiſite at firſt to open a Vein in the Arm, and the next Day to order a Purgative Potion, ſuch as the following, *viz.* Take half an Ounce of Tamarinds, two Drams of Sena, with a Dram and a half of Rhubarb, and let all be boil'd in a ſufficient quantity of Water, till the Liquor is conſumed to three Ounces, which you are to ſtrain, diſſolving therein an Ounce of Manna, and as much Syrup of Roſes Solutive, to compoſe a Drink, which is to be taken at one Doſe. The Blood-letting and Purgation, may be alternatively repeated, while the Patient takes, from time to time, a Spoonful of Oil of ſweet Almonds freſh drawn, eſpecially if it be ſuſpected that the internal Parts are hurt; and for the external, a Liniment is to be prepared of the ſame Oil. It would be expedient on the firſt Day, to apply to the affected Part; a Pledget dip'd in the White of an Egg and Vinegar of Roſes, renewing that Pledget ſeveral times; and afterwards during ſeven or eight Days, you are to lay on a Cataplaſm, compos'd of red Roſe-flowers, Myrtle-berries and Leaves, of each 2 Ounces; Bean-meal, and Barley-meal, of each 1 Ounce; Wormwood half an Ounce, and the like quantity of Betony. The whole compound being boil'd in ſtrong Wine, a Cataplaſm is to be made of it, to which add Oil of Roſes and Oil of Camomil. After that interval of time, a Plaiſter of Diapalma is to be made uſe of.

In Contuſions of the Head, a Plaiſter of Ivy is to be apply'd, or the Part may be embrocated with Oil of St. *Johns*-wort. As for ſlight Contuſions, it may be ſufficient to

to apply from time to time, beaten Salt, wrap'd up in a piece of Linnen-cloth, which muſt be dip'd in warm Water, as often as it is uſed. For Contuſions where the Diſorder is greater, let the Patient take a Glaſs of good Wine, in which is put the Root of *Caryophyllata*, *Ana* 1 Dram, reduced into Powder. Otherwiſe, let Unctions of Oil of Roſes mingled with Oil of Myrtle, be laid on the wounded Part, which is to be afterward rub'd with Ointment of Alabaſter. Or elſe ℞ Cows-dung and Wormwood, of each a Handful; Bran half a Handful, and Camomil-flowers 2 Ounces; with as much Oil of Camomil, as will be requiſite to make a Plaiſter. It is alſo recommended to lay on the contus'd Members, an Ointment made of Honey-combs and Honey boil'd in Wine to be ſpread over Sheeps-leather, or on ſtrong Cloth, which muſt be renew'd for three Days.

As for ordinary Contuſions, with any Cut, the part that is moſt affected, muſt be bath'd with Luke-warm Wine, before you apply to the entire Part, the ſtamp'd Leaves and Juice of white Mullein, or the Leaves of Chervil bruiſed. In Contuſions of the Eyes, it is expedient to boil the moſt tender tops of Hyſſop-Leaves in common Water, or in White-wine, to be afterward laid on thoſe Parts.

Remedies for Tumours.

TO take away the Inflammation, apply often to the Part, a Decoction of Sulphur with Urine, or the Juice of River Cray-fiſh Hot, or a *Lixivium* of the Aſhes of Vine-branches, with Vitriol, Salt and Vinegar. If the Malady be not diſpers'd by theſe Medicines, it muſt be brought to ſuppuration, with Milk, in which *Venice*-Soap has been boil'd; and the Tumour being open'd, is to be dreſs'd with Balm and a Plaiſter of Sulphur.

When there is only occaſion for Repercuſſives, they muſt be preceded by Phlebotomy, and afterward ſome ſuch Remedies as theſe are to be made uſe of, *viz.* ℞ beſt Vinegar 3 Ounces; Whites of Eggs 1 Ounce and a half; red Roſes pulveriz'd half a Dram, mingle all together, and ſoak therein Pledgets, to be ſpread upon the Part Affected. Otherwiſe ℞ Ointment of Ceruſs 2 Ounces, Juice of Plantain and Houſe-leek, of each 1 Ounce; with Roſewater 2 Ounces; a mixture of theſe is to be ſpread on Tow, with which you are to cover the Part. You may alſo take a more gentle Plaiſter, made of Oil of Roſes and Milk, with Bread-crum. If the Pain be not then aſſwag'd, apply the following Cataplaſm: Let four Handfuls of Mallows be ſtamp'd a little, in order to ſoften them, and make their Stalks Tender: Then add Barley-meal half an Ounce, with an equal quantity of Oil of Violets, Oil of Roſes, and *Unguentum Populeum*; as much as is needful to give a conſiſtence to the Cataplaſm; for the want of which Medicine, this other may be prepar'd. Boil a ſufficient quantity of Wheat-flower in Water, adding Oil of Roſes at Diſcretion, and a little Saffron.

To abate the Tention, and inſenſibly diſſolve the Matter, ℞ Meal of Linſeed and Fenugreek, Aniſeed, Camomil-flowers, Melilot and Marſhmallows, as much as is requiſite: Let them be boil'd and ſtamp'd, that they may incorporate with the Mucilage of Marſh-mallow ſeed and freſh Butter; to which Bean-meal may be afterwards added. When Reſolvents prove unſucceſsful, recourſe may be had to ſuppuratives, ſuch as the following Plaiſter, ℞ Mallow-roots, and Violet-leaves, of each a Handful and a half; Marſh-mallow-roots cut ſmall 2 Ounces, white Lilly-roots 1 Ounce and a half: Let theſe Ingredients boil in Water, to the Conſumption of one half: Then add Mucilage of Cabbage-ſeed 1 Ounce and a half, Wheat-flower half an Ounce, Leaven 1 Ounce, Hoggs-lard, Freſh-butter, Breaſt-Milk, of each 1 Ounce; Oil of white Lillies, and ſweet Almonds, of each a ſufficient Quantity, to bring the Cataplaſm to a due Conſiſtence, which muſt be laid hot on the diſeaſed Part. Or ℞ Cows-milk one Pint, and Bread-crum grated fine 1 Pound, Cabbage-Juice 3 Ounces. Saffron half a Dram, Oil of white Lillies 3 Ounces: Make a mixture of theſe, and apply it hot to the Part.

When

When the Phlegmon is ripe, which may be perceived by the ceasing of the Pain, the relaxation of the Part, and the fluctuation of the Matter; due Preparation must be made to open it, by other means than the Incision-knife, and Fire or Caustick, which too much terrifie a Patient; in such cases, the following Remedies may be used ℞ simple *Diachylum* 2 Ounces, Leaven 1 Ounce, Oil of sweet Almonds half an Ounce; mingle these Ingredients together grosly, and spread them on Leather, putting Pigeons dung pulveriz'd fine 1 Dram, in the middle of the Plaister, and apply it to the Phlegmon, or else ℞ Leaven half an Ounce, Salt 1 Ounce, strong Vinegar 2 Ounces, and four *Cantharides* pulveriz'd: Pound these Ingredients in a Mortar, till they come to the consistence of Paste; and lay *Ana* half a Dram on the Apostleme, which is to be cover'd again with the preceding Plaister. The Tumour being open'd is to be dress'd with this Ointment: Let Turpentine 2 Ounces be well beaten with the Yelk of an Egg, spread some of it upon the Lint you are to put before the Aperture, and cover with the same Ointment, the entire Tumour; which is afterward to be bound up somewhat loosly, to digest the rest of the Matter, and preserve the natural Tone of the Member. At the end of some Days, all the Matter being Evacuated, the Wound is to be cleans'd with a mixture of Turpentine 2 Ounces, and Honey 1 Ounce; which may serve for several times, always taking care to cover this Medicine again, with the abovemention'd Digestive.

To incarnate and consolidate the Ulcer, ℞ Turpentine 2 Ounces, Honey 1 Ounce and a half; Frankincense, Myrrh, Mastich, Aloes, of each 1 Dram; *Sarcocolla* half a Dram, pulverize that which requires it; and pound all throughly with a Pestle, to make an Ointment. If the Pain encreases, put in Anodynes or Narcoticks, among which Henbane is of singular use; the Leaves of which are to be laid under hot Arches, and mingled with fresh Boars-grease, to be used in a Cataplasm. Balm of Sulphur is also very profitable in this case: The Part is to be rub'd with it Morning, Noon and Night, and afterwards cover'd with fine Rags bound lightly round about As for a particular Remedy of the same Virtue, which serves to mollifie, suppurate, open, cleanse and consolidate, no better can be found than *Rulandus*'s *Emplastrum Diasulphuris*, which is made thus. ℞ Oil of Sulphur 3 Ounces, Wax half an Ounce, *Colophonia* 3 Drams, and Myrrh 4 Ounces 7 Drams; the Wax and *Colophonia* being melted with Oil, and intermix'd; some Myrrh beaten fine is to be strew'd thereon, and the whole boil'd by degrees over a gentle Fire, stirring the compound continually with a *Spatula*; in the space of a quarter of an Hour take it from the Fire, and set it by to cool slowly.

If there be ground to fear lest the Tumour having obstinately resisted the usual Discutients and Resolvents, shou'd degenerate into a *Scirrhus*, take the following Cataplasm. Roots of Lillies and Marshmallows, of each 1 Ounce and a half; Roots of Bryony, *Cyclaminum* and wild Cucumber, of each 2 Ounces, boil all these in a sufficient quantity of White-wine; and having stamp'd them, add Dung of Pigeons and Goats, of each 1 Ounce and a half Sal Armoniac dissolv'd in distill'd Vinegar, *Bdellium* and *Opopanax* dissolv'd in Oil of *Sesamum*, of each 1 Ounce; *Laudanum* and Liquid *Styrax*, of each 1 Dram; with a sufficient quantity of Ship-pitch, to make it up into a Plaister. But if the Part be in danger of Putrefaction, it must be wash'd with Salt Water, in order to apply thereto Beanmeal and *Orobia*, of each 2 Drams, boil'd in Oxymel.

When extravasated Blood is spread about under the Skin, the affected Part is to be often embrocated with Spirit of Wine rectify'd and impregnated with Camphire or Saffron; or else with Sal Armoniack prepar'd in Spirit of Wine: Balsam of *Peru* mix'd with the Yelk of an Egg, and Spirit of Wine is also proper for it, especially in the Nervous Parts; as well as Decoctions or Cataplasms, made with the Roots of *Symphytum*, *Solomon*'s Seal, Melilot; Flowers of Elder and Camomil, and Saffron boil'd in Wine. In case the Suffusion be more considerable, it must be brought to Suppuration; and upon danger of a Gangrene, scarifie the

the Part deep, and apply *Unguentum Ægyptiacum*, with Digeſtives, as that of Turpentine, the Yelk of an Egg and Honey, with ſome drops of Spirit of Wine or Brandy.

For an *Eryſipelas*, or St. *Anthony*'s Fire, the Patient is to take Elder-bark inwardly, and outwardly apply Camphire and Saffron infus'd in Spirit of Wine, Carps-gall, Treacle with Salt of Wormwood, a Decoction of *Olibanum* and Myrrh, with Camphire and Saffron. If by the inconſiderate uſe of cold and aſtringent Medicines, the *Eryſipelas* be chang'd into an Ulcer, an Ointment may be us'd to good purpoſe, made of Litharge 3 Ounces, *Unguentum Populeum*, Ceruſs and *Galen's* Refrigerative, of each 1 Ounce and a half; with Oil of Roſes 1 Ounce, all well mix'd together in a Leaden Mortar. If the Patient labours under exceſſive Heat and Pain, apply to the Part Pledgets ſoak'd in an infuſion of *Saccharum Saturni* 1 Dram, Camphire 2 Scruples, *Opium* 20 gr. and Myrrh 4 Drams, in a Pint of Whitewine, taking care often to repeat the ſoaking of the Pledgets, with the ſame Compound.

This Diſeaſe (which conſiſts of an Expulſion, that the Blood makes of its moſt vivid unctuous Particles, to ſome Part of the Body where the Skin is fineſt or moſt irritated) is often cur'd by cauſing the Patient, from time to time, to take faſting, Red Cows-milk, *Ana* 8 or 9 Ounces, in which freſh or dry Elder-flowers have been boil'd over a gentle Fire; and this ill Diſpoſition of the Blood may be corrected by the following Electuary ℞ Treacle 1 Ounce, Bole Armoniack prepared, or *Terra Sigillata* 4 Scruples, Juniper-berries, Tormentil-root, *Carduus Benedictus* Seed, of each half a Dram; *Electuarium de Gemmis*, and *Diamargaritum*, of each 1 Scruple; raſpings of Ivory or Hart's Horn, Sorrel-ſeed, red Coral prepar'd, of each half a Dram, with a ſufficient quantity of Syrup of Lemmons; to make the Electuary Liquid; a Dram, or 1 Dram and a half, of which may be given as a Doſe, according to the Conſtitution of the Patient; who is to take this Medicine, in ſome Ounces of the diſtilled Water of Succory, *Carduus Benedictus*, or Scabious, in order to evacuate by a gentle Sweat, this ſubtil Humour, which remains ſeparated from the Maſs of others in the Surface of the Body.

When *Eryſipelas*'s firſt begin to ariſe, ſome preſcribe an application of cold and moiſt Medicines; as the Juices of *Solanum* and Houſe-leek, till the red Colour be taken off, and then lay on Pledgets heated, and dry'd in the Shade, after they have been ſoak'd in a Liquor made of Scabious and white Venice-Soap diſſolv'd therein. Some have preſerv'd, and even cur'd themſelves of this Diſeaſe, by eating for nine Days or more, every Morning in the Month of *May*, part of a Cake, compos'd of Wormwood-Tops, Leaves of Dandelion and common Germander, cut ſmall and mix'd in a New-laid Egg, with a little Butter or Olive Oil. It is alſo approv'd to apply after the General Remedies; Leaves of Ivy or Coltsfoot boil'd in Water: The Leaves and ſmall Branches of Savin groſly pulveriz'd, and ſtrew'd over the Fire, to make a Fumigation three or four times a Day about the diſeaſed Member, have often effected a Cure: And when the part is ulcerated, it is adviſeable to cover it with Virgins-Wax, mollified with the Hands in warm Water, and ſpread in form of a Plaiſter. Fomentations made with Pledgets, ſoak'd in a mixture of Water and Milk, or Brandy heated, are alſo us'd to very good purpoſe.

Serous Tumours without Pain, that proceed from an Obſtruction in the courſe of the *Lympha*, are to be dreſs'd with Water, in which Quicklime has been ſteep'd, and a mixture of Brandy: You are alſo to apply a Plaiſter of Bay-berries, with Oil, Goat's Dung and Honey, while the Patient takes inwardly, Decoctions of the Wood of Juniper and Saſſafras.

Oedema's or *White Swellings* which are produc'd by a more viſcous Seroſity are cur'd with Plaiſters of Bayberries, and diſtilled Oil of Amber renew'd twice a Day; or elſe with Cataplaſms of Roſemary, Juniper-Berries, Organy and Camomil in a *Lixivium*, of the Aſhes of Vine-branches, with ſome common Sugar boil'd therein. Cataplaſms may be alſo us'd that are made of Camomil, St. *John*'s Wort, Sage, Wall-Wort, Pellitory of the Wall, Bryony-Root and

and Onions, all boil'd in White Wine, with Honey. Otherwiſe, a Remedy may be prepar'd with Goat's Dung, and Man's Urine.

Scrofula's or King's Evil Swellings, are glandulous Tumours that take deep Root; they uſually ariſe in the Glands of the Neck, Armpits, Groin or Breaſts, and are cauſed by phlegmatick Humours which grow thick as Plaiſter, and make an obſtruction in the Ducts or Canals of the Body; therefore this Matter muſt be diſpers'd and diſſolv'd, or elſe evacuated by Suppuration. Scrofulous Tumours are diſſolv'd by Oil of Lizards prepar'd with Vinegar, or a Cataplaſm of Gum Armoniack and Hemlock, or elſe they are brought to ſuppuration by a Melilot Plaiſter compounded with Oil of ſweet Almonds and Snakes Greaſe; *Angelus Sala's* Magnetick Plaiſter mix'd with *Emplaſtrum Diaſulphuris* is alſo of good uſe. When the Abſceſs is open'd, apply the Digeſtive, with Mercury Precipitate, in order to cleanſe it afterwards with Balſam of Sulphur, or elſe with the Mundificative of Smallage, *Unguentum Apoſtolorum*, *Ægyptiacum*, and *Diachylum*.

It will be proper for Perſons troubled with the King's Evil to take the following Pills every Morning for forty Days. ℞ *Euphorbium*, Ginger, Turbith, the Juice of Orrice Root and Agarick, of each half a Dram, and having pounded the whole Maſs, make it up into forty Pills, one of which is to be taken every Day. The Patient may alſo be purg'd with the following Potion, to be drank at three Doſes: Make a Decoction of *Guiacum* 4 Ounces, Sarſaparilla half an Ounce Petony-Leaves a Handful, Ellecampane-Root 2 Drams, Sena-Leaves 1 Ounce and a half, *Carthamus*-Seed 1 Ounce, Aniſeed 2 Drams, Fennel-Seed 1 Dram, and in half a Pint of the Liquor diſſolve Agarick 3 Drams, Ginger 1 Dram, and Cinnamon 1 Dram and a half; when all is well ſtrained, add Syrup of Roſes Solutive 2 Ounces, to compleat the Potion. The Purgation being over, preſcribe a Bolus made of conſerve of Marjoram half a Dram, Treacle 1 Dram. Some likewiſe order the Patient to take Faſting, Powder of Spunge dry'd in an Oven; adding a little Sugar and Spice. Mr. *Boyle* recommends the Herb *Paronychia* or Rue-Whitlow Graſs, infus'd in Beer, to be drunk during ſome Days. Spirit of *Sal Armoniack* is alſo made uſe of to good purpoſe in this Diſtemper: The Powder of Broom Flowers ſtrew'd on Victuals and Drink likewiſe produces a ſingular Effect; as well as a Decoction of Female Southernwood in Whitewine, or an infuſion of a Handful of Roſemary, and the like quantity of Harts Tongue in two Quarts of Whitewine during 24 Hours, to be taken eight Spoonfuls at a time twice a Day.

In the mean while, the following Ointment is to be apply'd outwardly, *viz.* ℞ red Arſenick 2 Drams, Sublimate half a Dram, Roots of Serpentary, Betony, and Sowbread, of each half an Ounce; *Aloes*, *Hepatick* 1 Ounce; pulverize all theſe Drugs, and make an Ointment of them with Boars Greaſe. An Ointment made of the Marrow of a Leg of Veal 2 Ounces, freſh Butter half an Ounce, and the ſame quantity of Marſhmallows, may be alſo us'd to more Advantage. There is likewiſe a great deal of virtue in this Plaiſter: ℞ *Ammoniack* and *Galbanum* diſſolv'd in Vinegar, of each 1 Ounce, *Bdellium* half an Ounce, Harts-Marrow, and Gooſe Greaſe, of each 1 Ounce and a half; Mucilage of Marſhmallows, Fenugreek, and Linſeed, of each 2 Ounces, Litharge half an Ounce, Orrice Root pulveriz'd 1 Ounce; Oil of Anis and Wax an equal Part, as much as is requiſite to make up the Plaiſter. Or elſe take Seeds of Muſtard, Nettle, Sea-foam, Roots of round Birthwort and Bartram, of each half a Dram, Squills prepar'd, *Coloquintida*-Husks 1 Scruple, and *Sulphur vivum* 1 Dram. Theſe Ingredients being well pulveriz'd add *Gum Ammoniack* and *Bdellium* diſſolv'd in ſtrong Vinegar, of each half a Dram, with a little Wax and Oil of Lillies, to give it the conſiſtence of a Plaiſter; which being ſpread on Leather is to be apply'd to the Part Affected; but before the Application is made, it may be fomented with this Decoction. Take freſh Leaves of red Cabbage; Leaves of Henbane, Celandine, dead Nettle, Pimpernel, of each a Handful; Horſe-Radiſh Root 1 Ounce, and round Birthwort-Root half an Ounce; cut

cut all theſe Herbs, and boil them in Vinegar of Roſes.

Otherwiſe take Brandy 1 Ounce and a half, Camomil Flowers half a Dram, Fenugreek Seed one Dram, Lavender half a Dram; Let theſe Drugs be mix'd and boil'd a little, in order to ſtain the Decoction, with which you are to foment the part hot with a Spunge, during the Night. After this Remedy, the following Plaiſter will be requiſite: Take Muſtard Seed 1 Dram, Nettle Seed half a Dram, *Sulphur vivum*, 1 Dram and a half, Gum Ammoniack diſſolv'd in Brandy 2 Drams, *Diachylum* Plaiſter mix'd with Orrice 3 Drams; mollifie theſe with Oil of Lillies, and make up the Plaiſter. Otherwiſe, this Cataplaſm may be apply'd: Take Orrice Root 4 Ounces cut ſmall, to make a Decoction in Whitewine; and when you have ſtamp'd this Root ſo boil'd, add Beanmeal and Barley, of each 2 Ounces and a half, with Honey 4 Ounces, to mingle all together: But it is neceſſary, before the Cataplaſm is made uſe of, to rub the Scrofulous Tumours with this Liniment; Take Oil of Lillies and Sowthiſtle, of each 1 Ounce, juice of Orrice Root half an Ounce, Brandy 2 Drams; boil the Juice with the Oils, and add ſome Gum Ammoniack diſſolv'd in Vinegar, to compoſe the Liniment.

When theſe Tumours are open'd, nothing is more proper than the following Medicine. Take Oil of Bays 1 Ounce and a half, Ceruſs pulveriz'd, and dulcified with Brandy, 1 Ounce, Roche-allum half an Ounce, common Salt 2 Drams, and make a mixture of the whole. Or elſe take the Leaves of Tobacco bruis'd, when that Herb is in Flower; otherwiſe make a kind of Glue with Mealduſt and Vinegar, to be boil'd over a gentle Fire; and when it is come to a moderate Conſiſtence, ſpread it upon a Pledget of new Cloth, to cover the Ulcer: This Application is to be renew'd every twelve Hours, to draw out a great deal of Matter; and when the Tumour will yield no more, you are to apply a Plaiſter of *Baſilicon*, and afterwards of *Diapalma*. Others to conſume the ſcrofulous Gland, prepare an Ointment, with equal quantities of Turpentine, Yolks of Eggs, and Honey, beaten together, and for internal Remedies, make uſe of this Potion. Take *Scrofularia*, *Filipendula*, Burnet, Broom Flowers, *Piloſella*, red Cabbage, Agrimony, of each one Handful; round Birthwort, Roots of *Spatula fætida*, and Horſeradiſh, of each 1 Ounce, Ellecampane half an Ounce, Coriander Seed 1 Dram and a half; let all be boil'd in two Pints and a half of a Liquor, compos'd of two Parts Wine, and one part Water; ſweetning the Decoction with Sugar, to be taken inſtead of common Drink.

The *Scirrhus* is a hard Swelling, almoſt without Pain, and of an equal Colour throughout its whole Extent: It is form'd of an inward and depraved mixture of Fibres and Canals, which lie ſo cloſe together, that the Humours therein are coagulated. This Tumour may be mollified and diſſolv'd by an Application of the Plaiſter of *Vigo*, with *Mercurius Dulcis*, or a Plate of Lead ſpread over with Mercury; or with a Plaiſter of Hemlock, with Sal Armoniack; thoſe of Mandrake, Tobacco, and wild Cucumber; or a Cataplaſm made of the Leaves of Violets, Mallows, Marſhmallows, Beets, Elder, Rue, Wormwood, with Camomil Flowers, Lilly Roots, and the Dung of a Horſe and Cow; all theſe are to be boil'd in Wine; adding Honey and Hog's Lard, and the Cataplaſm made with Bread-crum: Plaiſters of Melilot and Mucilages mix'd with Oil of Earthworms and Flowers of Sulphur; and even Oil of Tobacco, and Gum Ammoniack diſſolv'd in Vinegar, *&c.* are all very effectual Remedies.

Some Practitioners in Surgery, order a very regular Diet during the whole courſe of the Cure, and the uſe of ſuch Food as affords good Juice. They preſcribe Syrups of Fumitory and *Epythymum*, and Purgatives of Sena; afterwards they apply the following Cerates. Take Greaſe of a Gooſe, Duck and Pullet, of each 3 Drams, Ammoniack diſſolv'd in Vinegar 1 Ounce; *Bdellium* and *Galbanum*, of each 1 Dram; Plaiſters of Marſhmallows and Melilot, of each half a Dram: Let theſe Drugs be boil'd with the Mucilages of Linſeed, Fenugreek and Marſhmallows 1 Ounce and a half, till they come to the conſiſtence of a Cerate. Another Medicine may be compounded thus: Take

white *Diachylum*, Gum prepar'd with Marſh-mallows, and *Unguentum Agrippæ*, of each 2 Drams; Oil of white Lillies 1 Dram; Ducks Greaſe 2 Drams: Make the Diſſolution and Mixture of all over the Fire; adding Ammoniack, *Bdellium*, and *Laudanum*, of each 1 Scruple, and diſſolve the compound in Vinegar, in order to make the Cerate: Or elſe to diſſolve theſe ſorts of hard Tumours, apply this Plaiſter. Take Seeds of Muſtard and Nettles, Sulphur, Seafoam, Birthwort, *Bdellium* Ammoniack, Oil of Anis, of each an equal Quantity; and make a Plaiſter of them, with Wax and a little Vinegar. This Medicine often effects a Cure in the ſpace of eight Days, when it is renew'd twice or thrice during that Interval.

But when the *Scirrhus* is about to change into a Cancer, the following Plaiſter is to be prepar'd: Take Tutty 2 Scruples, burnt Lead 1 Dram, Litharge, Quick-ſilver 1 Dram, Juice of Plantain, Centinody, Night-ſhade, of each half an Ounce: Theſe Ingredients are to be boil'd to the Conſumption of the Juices, and afterward well pounded in a leaden Mortar, to give them a brown Colour: Sometimes the Practice proves ſucceſsful, when after the general Remedies Suffumigations are made under the part Affected, that has been ſprinkled with Vinegar, and out of which it is deſign'd to draw Sweat; afterward it is to be cover'd with a Plaiſter of Mucilages, and that ſucceeded by another Plaiſter of Ammoniack, which compleats the Cure. Some diſperſe this Malady, with Cow's Dung boil'd on the Tumour, to diſſolve it. Or elſe they cover the *Schirrus*, with a Cataplaſm made of Barley Meal, and Bran, of each 2 Ounces; Goat's Dung 3 Ounces, Melilot and Camomil, of each half a Handful: The whole being boil'd in a *Lixivium*; add hot Wine, and a little Oil of Roſes, to give it the form of a Medicine.

The *Cancer* depends not only upon a vicious ranging, and a too compact contexture of the Fibers and Canals as the *Scirrhus*, but even upon a Diſpoſition of the Pores proper to corrupt the Juices, and render them Cauſtick and Corroding. For an *Occult Cancer*, a Plaiſter is to be made with Powder of Lead, Oil of Roſes, and Saffron beaten together; and when this Tumour is ulcerated or manifeſt, a Plaiſter of Frogs, may be prepar'd with Hart's Horn and Lead, pounded together in a leaden Mortar, with a hot leaden Peſtle. Ointment of Tutty and *Diapompholyx* are alſo proper for this uſe; or elſe take Juice of *Solanum* 8 Ounces depurated and ſtirr'd about in a leaden Mortar: Add to theſe common Tutty 2 Drams, waſh'd 8 or 10 times in Night-ſhade Water; Lead 1 Dram, burnt and waſh'd in like manner, and Oil of Roſes half an Ounce, all intermix'd in a leaden Mortar, to make a Liniment: The calcin'd Powders of Toads, Moles, Frogs, and Cray-fiſh, ſerve to mundifie, as well as the Broth of Vipers, and Cray-fiſh, Lime-water, or Whay boil'd with Chervil, to which is added Camphire or Sugar of *Saturn*. It is alſo order'd to take inwardly the Powders of Crabs-eyes, Vipers, *Millipedes*, and other ſweet *Alkali's*.

To deſtroy *Fungus's*, or ſoft and whitiſh Swellings, that generally grow round about the Joynts, where Membranes and Tendons are hurt; they muſt be cover'd with deſiccating Powders, made of Harts-horn burnt, Myrrh and *Pompholyx*; or elſe Mercury Precipitate.

As for *Encyſted Tumours*, where the Matter is contain'd in a particular Bag, they muſt be diſſolv'd, and that Bag extirpated. Take Roſemary, Elder, Sage, Wormwood, great Chelidony, Camomile, Melilot, St. *John*'s-wort and Tobacco, which are to be boil'd in White-wine, with Chimney Soot and Mercurial Honey; adding Cummin-ſeed beaten, and Oil of Worms; of theſe make a Cataplaſm, to be renew'd twice a Day. Otherwiſe, take an equal quantity of the Plaiſters of *Diachylum*, and of *Vigo*, and four times as much of Plaiſter of Mercury and *Emplaſtrum Divinum*: Let theſe be diſſolv'd together, and mingled with Saffron and Oil of Tobacco, in order to make a Plaiſter, to be ſpread on a piece of Leather, which is to continue on the Tumour for the ſpace of eight Days: Then the Plaiſter muſt be taken off, to renew it with freſh Matter, and laid on again for Eight Days, after having waſh'd and bath'd the Tumour with hot Urine or Brine. The Matter of theſe Tumours may be alſo diſſolv'd with the following Medicine. Take freſh black Pitch

6 Ounces, Aſhes of Oak or Elm 2 Ounces, Spunge burnt 1 Ounce and a half, and half a Glaſs of Vinegar. The whole being boil'd over a gentle Fire in an earthen Pot, to the entire conſumption of the Vinegar, will make an Ointment which is to be ſpread upon ſoft Leather, and apply'd to the Tumour; from which you are to take off the Plaiſter every Day, and wipe off the Humour that iſſues out taking care to renew the Ointment from time to time.

To diſſipate the hardeſt Tumours, ſuch as the moſt part of thoſe that are call'd *Lupus*'s or Cancers in the Thighs, it is often ſufficient, to keep on the Part for 8 Days, a Plate of Lead rubb'd with Quick-ſilver, or elſe a Cataplaſm made of Sorrel Leaves, wrap'd up in wet Paper, and laid under Aſhes, and afterward mingled with the ſame Aſhes. But when the Matter of the Tumour is thick like Plaiſter and hard; there is no other Remedy, but to extract it by Inciſions made in the Skin; otherwiſe the bottom of the Tumour may be ty'd round about with a String, which is to be drawn cloſe, from time to time, till the Humours are abſolutely hinder'd from paſſing in, to nouriſh it, to the end that by this means it may be dry'd, and fall off.

The *Ganglion* is another kind of Tumour, hard and without Pain, uſually caus'd by a Blow, by over-hard Labour, or by ſome great Strain, which making a violent Extenſion, in the Tendinous or Membranous Parts, gives occaſion to the overflowing of a Juice that ſettles and grows hard, under thoſe Parts, it may be mollify'd and diſſolv'd by the following Cerate: Take *Oxycroceum* 1 Ounce, *Ammoniack* and *Bdellium* diſſolv'd in Brandy, of each 2 Drams; Orrice 1 Scruple, and three Earth-worms waſh'd with, and diſſolv'd in Wine: Mingle all theſe Ingredients with a little Oil of Turpentine and new Wax, and ſpread the compound on a piece of Leather, in order to cover the Tumour, which muſt be bound up hard; and having loos'd the Bandage, at the end of 4 or 5 Days, to take off that Cerate, you are to make under the Part, a Fumigation of Vinegar, wherein Savoury or Origan has been boil'd; which is to be ſet for that purpoſe, over a Pan of Coals, or on Stones, heated Red-hot in the Fire: Otherwiſe, (if you pleaſe) rub the Tumour with the Juice of Rue mix'd with Brandy, and ſoak therein Pledgets, with which you are to keep the Part cover'd.

The *Aneuriſm*, which proceeds for the moſt part, from a Wound or Orifice, made in an Artery prick'd inſtead of a Vein, may be cur'd by the Application of a Plate of Lead kept cloſe on the Tumour, by means of a ſtrong Ligature, taking care to make Phlebotomies by opening the oppoſite Vein: Or elſe, apply a Plaiſter made of the Powders of Sumach, *Hypocyſtis*, Aloes, Dragon's Blood and Frankincence, of each an equal Quantity; mix'd with the white of an Egg: If the Tumour continue to riſe, the Surgeon muſt preſs the Branches that proceed from the Axillary Artery in the Arm, till no Pulſe or Beating be felt in the Wriſt. Afterward having made a long Inciſion, to take out the grumous Blood that lies round the Tumour, he is likewiſe to preſs the open Artery, and apply to it little round Pellets of white Vitriol wrap'd up in Cotton, and then ſtrew over them Powder of *Sarcocolla*, *Colophonia* and Roſin ſtrain'd thro' a Canvaſs Sieve, applying thereto Bolſters with a cloſe Bandage over all: The Vitriol being liquify'd by the Blood which ſoaks thro', will by little and little, corrode the edges of the Wound, which will cloſe again; the Vitriol Pellets are to be left till they fall off themſelves, as it happens, after the Artery is conſolidated.

It is alſo adviſed in order to diſperſe the *Aneuriſm*, to apply the following Cerate or Plaiſter. Take Iron-droſs 5 Drams, Mummy, *Tragacanth*, Gum Arabick, of each 3 Drams; Frankincenſe, *Acacia*, Sandarack, of each 1 Dram and a half, Mouth-glue, Gall-nuts and Cypreſs, of each 1 Ounce; Oak-Miſletoe 3 Ounces, Plaiſter 2 Ounces, and Roſin 1 Pound and a half. A Cerate is to be compos'd of all theſe Drugs, with the Juice of great Comfrey and red Wax: And to make the Plaiſter, take *Emplaſtrum Diacalciteos* 2 Ounces, Powders of Maſtich, red Roſes, and Myrtleberries, and Root of great Comfrey, of each 1 Dram; with a ſufficient quantity of Oil of Roſes. This Medicine being apply'd, you are to lay over

it a Plaiſter of Linnen in ſeveral Folds, which is to be bound hard upon the Part, to ſtop the flowing in of the Blood.

Varices which are Tumours made by Veins, when their Coats are relaxated by ſome Diviſion of the Fibers, or too much extended by Strains; are cur'd, if after having evacuated the groſs Blood (which is ſometimes contain'd therein) by light Punctures, a Plate of Lead be laid on the Part: Or elſe, if a Cataplaſm be us'd, made of Lupine-meal 1 Pound, Goats-dung dry'd 3 Pounds, and a ſufficient quantity of Vinegar, moderately ſtrong, in which a piece of Steel made Red-hot in the Fire, has been quench'd five or ſix times. In *Varices* of the Ribs, *Fernelius* recommends a Fomentation of Roche-allum, in very ſtrong Vinegar, and a cloſe Ligature made over the Part. Some make uſe of a Medicine, compos'd of *Bolus Armena*, Dragons-blood, Maſtich, Gum-dragon, all macerated in Pomegranate-wine, to be afterward made up in form of a Candle; which they apply longways to the whole extent of the ſwoln part of the Vein; cauſing this Medicine to be kept on, by a kind of Gutter faſten'd to the Part.

Remedies for Luxations.

When the Part has been ſet again, after a conſiderable Luxation, and there remains a Tumour round about the Joynt; let that Part be anointed, with diſtilled and rectifyed Oil of Tartar and Humane Bones, with Harts-horn or Quick-lime; and to ſtrengthen the Member, you are to moiſten, from time to time, the Pledgets, Bandages and Bolſters with Wine; into which has been put a Decoction of the Flowers of St. *John's* Wort, Camomile, Roſemary and *Stœchas Arabica.* But if the Luxation was made by a Maſs of a Plaſtry Humour fix'd in the Joynt; it is requiſite to rub the Part with *Petroleum*, or Balſam of *Peru* diſſolv'd in the Yolk of an Egg, adding thereto Spirit of Juniper. Or elſe take a Plaiſter of Amber and Gum *Elemi*, with Wax and Roſin; or *Crollius's* Styptick Plaiſter, malaxated with the Oil of Philoſophers.

When the Luxation happens by the Relaxation of the Ligaments, the Patient muſt take inwardly Medicines prepar'd with Saſſafras, Spirit of Sal Armoniack, *Poterius's Aurum Diaphoreticum*, and for outward Applications, the Spirit and Liquor of Earth-worms, adding moderate Aſtringents: Or elſe, apply *Crollius's* Styptick Plaiſter malaxated with *Petroleum*: Or a Plaiſter of *Tacamahacca* and *Caranna*, with diſtilled Oil of Amber.

Remedies for Fractures.

If there be an Inflammation, it is needful, to cure it, before you meddle with the Fracture. The parts of the Bone, being ſet again in their proper places, the fractured Part is to be embrocated with Spirit of Wine, to which is added a third part of Spirit of Earth-worms: Honey temper'd with Spirit of Wine is alſo ſerviceable, when there is a Contuſion, as well as Unctions with Oil of St. *John's*-wort and Earth-worms, refin'd by means of diſtilled Oil of Turpentine and Roſemary. Afterward you are to apply a Plaiſter made of the Root of Goats-beard pulveriz'd, and an extract of round Birth-wort, prepar'd with Spirit of Wine impregnated with Amber; to which is added white Roſin, Turpentine and Wax, which is to be malaxated with Balſam of *Peru*, or diſtilled Oil of Amber, at the time when this Remedy is us'd. Three or Four Days after, the Bandages are to be taken off, to bathe the Part with the Juices of Vervine and Vulnerary Herbs. In caſe the Ligaments, with the Nervous and Tendinous Parts have undergone violent Contorſions, and chang'd their Place; after the ſeventh Day, a Cerate is to be apply'd, made of the Root of *Solomon's*-Seal 4 Ounces, *Alchymilla* 1 Ounce, and Plantain-leaves 2 Handfuls: And having boil'd theſe Herbs to the conſiſtence of Pap, add a ſufficient quantity of white Wax, to make a ſoft Cerate, which is to be mix'd with Oil of Myrtleberries 2 Ounces, Oil of Turpentine 1 Ounce and a half, Ointment of Marſh-mallows 1 Ounce, *Bolus Armena* 6 Drams, Dragons-blood 3 Drams, Frankincence 1 Dram, all mingled together.

A Simple *Fiſſure*, newly made, is eaſily cur'd with a Plaiſter of *Symphytum*, and if an Abſceſs ariſe in the Part, it muſt be open'd when ripe, in the place of the Crack, in order to take away the *Caries*, by ſtrewing upon it Powder of *Euphorbium*, or elſe by ſprinkling it with diſtilled Oil of Cloves. When there is no ground to ſuſpect that any ſplinter of the Bone laid bare, is ſeparated, the edges of the Cavity are to be joyn'd together, as ſoon as poſſible, by the means of Glue. For the reſt, the generation of a good *Callus* in the fractur'd or crack'd Bones, is to be promoted by cauſing the Patient to take internal Vulneraries; ſuch as Agrimony, great Comfrey, *Geranium*, and Savin; to which Roſemary muſt be always added; as well as *Oſteocolla*, taken Faſting, to the quantity of 1 Dram, or in a Decoction of *Vinca Pervinca*. The Juice of Cowſlip or Primroſe, taken with the Juice or Powder of Agrimony Root, as well as the moſt part of viſcous Aliments are alſo proper upon this Occaſion.

Otherwiſe, let the Patient take every Day Faſting, of the following Powder 2 Drams, in Broth or Meat. Take *Oſteocolla* well prepar'd 1 Ounce, choice Cinnamon 3 Drams, and Sugar 2 Ounces; let all be pulveriz'd and mix'd together. During the uſe of this Remedy, the Part is to be anointed with this Liniment. Take Oil of Earth-worms 2 Ounces, Oil of Juniperberries 2 Drams, Juice of Earth-worms 1 Ounce; mingle theſe together, and after having anointed the Part with this Compound, apply a Plaiſter compos'd of the Plaiſter of *Vigo* for Fractures 2 Ounces; *Oxycroceum* half an Ounce, *Oſteocolla* prepar'd 1 Ounce and a half, and Powder of Earth-worms 1 Ounce, with a ſufficient quantity of Oil of Earth-worms. This Medicine is to be renew'd at the Expiration of three or four Days ſucceſſively, and the reſt of the Part that is not cover'd, anointed every Day, with the Liniment juſt now preſcrib'd. The following Plaiſter is alſo much eſteem'd. Take Meal of Beans, Peas, Barley, and Mealduſt, of each half an Ounce; Maſtich, Gum-dragon, Gum-arabick, Mummy; *Bolus Armena*, Myrtle-berries pulveriz'd, of each 3 Drams; five whites of Eggs, beaten in ſtrong Styptick Wine, with as much Plantane Juice, as may ſerve to incorporate the Mixture. After the Application of this Plaiſter, which is of an Aſtringent and ſtrengthning Quality, a Pledget dip'd in Oil of Roſes, may be laid near the Fracture. The following Plaiſter is likewiſe of ſingular Uſe. Take the whites of four Eggs, Oils of Myrtles and Roſes, of each 2 Ounces, clear Turpentine 1 Ounce and a half, Myrrh and Aloes, of each 2 Drams; Dragons-blood and *Bolus Armena*, of each half a Dram; Meal duſt 3 Ounces; and let all be well mingled together.

When the *Callus* is of a juſt Quantity, and it only remains to ſettle it well in order to ſupport the Parts of the Bones that are ſet together again, this Plaiſter is to be apply'd. Take Oil of Roſes 2 Ounces, Wax 3 Ounces and a half, Roſin pulveriz'd 3 Ounces, *Colophonia*, Maſtich and Frankincence, of each half an Ounce, Cypreſs-Nuts, and Root of *Rubia Tinctorum*, of each 1 Dram, and Saffron half a Dram: Make a mixture of all theſe Drugs, and ſpread it upon Pledgets, to be laid upon the fractured Part.

Remedies for Wounds.

When the Wounds are recent, Sutures are to be made; or rather, the divided Parts, muſt be gently drawn together, and kept in their natural Poſition, by means of a Glue made of Gum-dragon, Gum-arabick, Maſtich, Frankincenſe and *Sarcocolla*, of each 1 Scruple; all pulveriz'd and ſtir'd about with the white of an Egg: Let this mixture be ſpread on a Pledget, and apply'd to the edges of the Wound that is clos'd, when the caſe will admit of it: In the mean while, the Patient is to take inwardly, Crabs-eyes and *Antimonium Diaphoreticum*; and if a Feaver intervene let him make uſe of a mixture of Nitre and Antimony, or a Decoction of Vulnerary Herbs; as *Achymilla*, St. *John*'s Wort, Ground-ivy, *Veronica*, Wormwood, Centory, Bugle, Sanicle, *&c.* For a ſpeedy Cure, it is expedient to waſh the Wound with Spirit of Wine, and then apply Powder of Aloes Hepatick

on Cotton, impregnated with Oil of St. *John*'s-wort, laying the following Liniment over it. Take Benzoin 1 Ounce, Brandy 1 Ounce and a half, Maſtich 1 Dram, and black Balſam half an Ounce; and make the Liniment, which is proper to cicatrize ſimple recent Wounds. The following Water is much eſteem'd, to waſh all ſorts of Wounds, and ſoak the Pledgets with which they are cover'd. Take Brandy well rectify'd three Quarts, *Hypericum*, Hyſſop, Milfoil, of each 2 Handfuls; Powders of Frankincenſe and Myrrh, of each 3 Ounces: Let all theſe be infus'd during four Days, and diſtill'd in *Balneo Mariæ*, or in *Balneo Arenoſo*, ſtopping cloſe the Head of the Alembick and the Recipient: This Water will be of greater Efficacy, when accompany'd with theſe Powders. Take Frankincenſe, Maſtich, Myrrh, *Sarcocolla*, *Bolus Armena*, and Dragons-blood, of each an equal Quantity; which you are to pulverize, and mingle together, in order to be ſpread over the Wound, bath'd with the preceding Water, and upon the Pledgets dip'd in the ſame Water.

This compound Oil is alſo of admirable Virtue for the ſame Maladies, Take old common Oil five Quarts, Pinetree-Roſin, Turpentine and Wax, of each 2 Ounces; St. *John*'s-wort, Roſemary, Roſes and Milfoil, of each half a Handful; Saffron 1 Dram, and freſh Hoggs-lard 6 Ounces: Let the whole mixture be ſet in *Balneo Mariæ*, to be afterwards us'd as hot as the Patient can well endure it. Otherwiſe, Take clear Turpentine, and Plaiſter of Gum *Elemi*, of each 1 Ounce and a half; Mutton-ſuet 2 Ounces, and old Hogg-lard 1 Ounce; Infuſe all over the Fire, and make a Liniment, to anoint the Wound with a Feather.

The following Plaiſter is no leſs recommendable, Take Oil of Roſes, Violets, and Camomile, of each 2 Ounces, Hens-greaſe, and Veal-marrow, of each 1 Dram, Earthworms, waſh'd with ſtrong Wine 2 Drams, Freſh-butter 1 Ounce and a half, Mucilage of Marſh-mallows 1 Pound; and after all have been boil'd together, to the conſumption of the Mucilage; ſtrain them, and put into the Liquor, Litharge pulveriz'd fine 5 Ounces, *Minium* 6 Ounces, with as much white Wax as is requiſite to make a Cerate; adding Turpentine 2 Ounces and a half, and Maſtich 1 Ounce. This Ointment may alſo be us'd to very good purpoſe. Take four parts of Sage, with three parts of Milfoil, cut ſmall, and boil'd for two Hours in a Veſſel, with Butter 8 Pound: Afterward the whole is to be ſtrain'd; and having ſet the Liquor over the Fire again, add Harts-greaſe 2 Pound, and Goats-ſuet 1 Pound, with Wax 1 Pound, a quarter of a Pound of Pine-tree-Roſin, and Turpentine 1 Pound and a half: Theſe being all boil'd till they are diſſolv'd, take the Pan from off the Fire, and ſlip in as much *Verdet* or *Spaniſh* Green, as will ſerve to give the mixture a green Colour. All theſe Ingredients being well beaten together, with Oil of Spike 2 Ounces, till they are cool, will make an Ointment almoſt of univerſal Uſe.

For Wounds in the Nerves or Ligamentous Parts, the Patient muſt take inwardly Harts-horn with Amber, and a mixture of diſtill'd Oil of Wine 1 Ounce, and Camphire half a Dram, to be drop'd into the Cavities. Balſam of *Peru*, with diſtill'd Oil of Lavender is alſo of good uſe in this Caſe. Or elſe let the wounded Part be anointed, with a compound of Ointment of Marſh-mallows 4 Ounces, diſtilled Oil of Bays 1 Dram and a half, and diſtilled Oil of Amber half a Dram. A Plaiſter made of *Euphorbium* 1 Scruple, Roſin half a Dram, as much Turpentine, and a little Wax is likewiſe proper, being apply'd very Hot. Powder of Earth-worms, with Turpentine and Oil of St. *John*'s-wort may alſo be laid upon the Wound. Or elſe apply at firſt a mixture of Oil of Turpentine 1 Ounce, and Brandy 1 Dram; to which add a little *Euphorbium*. Otherwiſe take Venice-Turpentine and old Oil 1 Ounce, with a little Brandy; then the Pain may be aſſwag'd, and the Tumour abated by the following Cataplaſm. Take Barley-meal and *Orobia*, of each 2 Drams; Camomile-flowers and Melilot, of each a Handful; Freſh-butter without Salt 1 Ounce and a half; with a convenient *Lixivium*, Oil of St. *John*'s-wort Seed, in which the Flowers of the ſame Herb have

have been macerated, ought not to be omitted in Wounds of the Nerves.

The following Ointment is a no leſs Sovereign Remedy. Take leſſer Centory, Dogstongue, *Piloſella*, great and little Comfrey, of each one Handful; Earth-worms half a Pound, common Oil 1 Pint, Wine 1 Pint and a half: Having mix'd theſe together, leave them to ferment during ſeven Days, and then add Rams-ſuet 1 Pound; black Pitch and Roſin, of each a quarter of a Pound; Gum Ammoniack, *Galbanum* and *Opopanax* diſſolv'd in Vinegar, of each 5 Drams: Let all theſe Ingredients be boil'd over a gentle Fire, to the conſumption of the Wine and Vinegar; and the Liquor being ſtrain'd, put in, when it is almoſt Cold, of Turpentine half a quarter of a Pound, Frankincenſe, Maſtich, *Sarcocolla*, of each 3 Drams; Saffron 2 Drams, and beat all in a Mortar, to make an Ointment: But if the Nerves be laid bare, nothing muſt be apply'd that is ſharp; and in that caſe great Relief may be had, by the uſe of Lime waſh'd ſeveral times in the Sun, with the ſweeteſt Water, and dry'd, in order to be mix'd with a ſufficient quantity of the beſt Oil of Roſes, before it is laid on. *Unguentum Diapompholygos*, and *Emplaſtrum Diachalciteos*, are proper to compleat the Cure.

When the Wound is in the Joynts, from whence an *Ichor* iſſues out, it will be proper to apply an Ointment compos'd of Turpentine half an Ounce, waſh'd with Sage-water; common Honey, or Honey of Roſes 3 Drams, Barley-meal 2 Drams, and Succotrin Aloes 3 Drams and a half. Or elſe, Take Meal of Linſeed, Barley and *Orobia*, of each equal Parts; which you are to mingle with a ſufficient quantity of Honey, to the end that all may incorporate together over the Fire; and when the Liquor is Cool, put in Powders of Frankincenſe and Myrrh, of each half an Ounce. If it be requiſite to generate Fleſh, for the filling up of a hollow Wound, you are to cover it with the following Medicine, ſpread upon a Pledget. Take Turpentine 4 Ounces, Oil of Myrtle 2 Ounces; Pine-tree-Roſin and *Colophonia*, of each 1 Ounce; Frankincenſe 1 Ounce and a half, Dragons-blood half an Ounce; with a little Wax. This Remedy is alſo of ſingular Uſe; Take Frankincenſe and Myrrh, of each 2 Ounces, Dragons-blood half an Ounce, *Greek* and Ship-pitch, of each 1 Ounce; Centory 3 Drams, Turpentine and Pinetree Roſin, of each 6 Drams; Cows-ſuet half an Ounce, Wax 1 Ounce and a half, and as much Oil as is needful, to give it the conſiſtence of an Ointment: And to cicatriſe the Wound, Take Turpentine half an Ounce, Oils of Roſes and Myrtle, of each 1 Ounce; Mutton-ſuet 2 Ounces, Wax 2 Ounces; Litharge, burnt Lead, *Minium*, Ceruſs, of each 3 Drams; red Coral 1 Dram, prepar'd Tutty 2 Scruples; and make an Ointment of all theſe Drugs.

To cure the puncture of a Tendon, Take white Lilly-root 4 Ounces, boil'd in Cows-milk, and pounded; Meal of Linſeed and Oats, of each 3 Ounces; which you are to boil to the conſiſtence of a Cataplaſm, in the ſame Milk, wherein the Roots were boil'd; and apply this Remedy Morning and Evening to the part Affected.

In Wounds accompany'd with a Contuſion, the Gangreen may be prevented, by applying forthwith Oil of Wax, or Oil of Philoſophers, and laying a Plaiſter of Cummin or Bay-berries over it; the Contuſion being almoſt diſpers'd, you are then to make uſe of Spirit of Sal Armoniack diſtilled with Quick lime.

When it is requiſite to cauſe Suppuration, as in the moſt part of Gun-ſhot Wounds, take an Ointment made of Oil of Lillies, and Violets, in which Puppies newly brought forth, and Earth-worms have been boil'd. When the Suppuration is over, the following Medicine is to be us'd. Take Turpentine 5 Ounces, Oil of Roſes 1 Ounce, Honey of Roſes 3 Ounces; Myrrh, Aloes, Maſtich, round Birth-wort, of each 1 Dram and a half; and Barley-meal 6 Drams; mingle all theſe together, and if the Wound be remote from the Nerves, put in a little Mercury Precipitate. Otherwiſe, Take Orrice-root, Flowers of *Panax*, and of the Caper-ſhrub, of each 2 Drams; round Birth-wort, Manna, Frankincenſe, of each 1 Dram; with Honey of Roſes, and Turpentine, of each 2 Ounces; to make a

Plaiſter

Plaiſter of all theſe Ingredients. An excellent Suppurative may alſo be prepar'd, with melted Hogs-lard, the Yolk of an Egg, Turpentine and Saffron, after which Deterſives are to be apply'd. It is neceſſary, in conſiderable Wounds, to lay over the Dreſſing, a Cataplaſm ſuch as the following. Take Leaves and Flowers of Camomile and Melilot, Wormwood-tops, Mallows, Marſh-mallows, Seeds of Line and Cummin pulveriz'd. Let the whole compound be boil'd in Wine, and add Barley-meal, to give it a Conſiſtence.

In Wounds made by the biting of venomous Creatures, as Vipers and Serpents, a red hot Iron is to be apply'd. In the biting of a mad Dog, it is proper to lay on the Part, when ſcariſy'd, Treacle mix'd with Onion, and Cloves of Garlick pounded; and the impreſſion of the Poiſon being thus taken off, a gentle Digeſtive is to be made uſe of, ſuch as *Unguentum Ægyptiacum*, with diſtilled Vinegar and Treacle.

In ſuperficial Wounds of the Head, Take Oil of St. *John*'s-wort, and Balſam of *Peru*; upon which is to be laid a Plaiſter of Betony, with *Tacamahacca*, malaxated with Balſam of *Peru*: When the *Cranium* or Skull is hurt, without being entirely penetrated, the *Caries* may be prevented, by ſtrewing on the Part, the Powders of Orrice-root, Aloes and Myrrh, impregnated with Spirit of Wine, or Oil of Turpentine; avoiding unctuous Medicines. In a Wound of the Eyes, Repercuſſives are to be us'd forthwith; and for Narcoticks, Take the Lungs and Caul of a Sheep, boil'd in Milk, and apply them hot to the Temples; Breaſt-Milk, or Pigeons-blood, taken out of a Vein under the Wing, is alſo proper in this Caſe. For Deterſives, you are to apply the Livers of a Thornback, Hare and Partridge, with the Waters of Eye-bright and Fennel, Sugar-candy and Saffron. For a *Sarcotick*, Take Mucilages of *Olibanum*, Gum Arabick, Gum Dragon and *Sarcocolla*, extracted in Barley-water, of each 2 Drams; Aloes waſh'd thrice with Roſe-water 1 Dram, Ceruſs burnt and waſh'd, and prepar'd Tutty, of each half a Dram; to make a *Collyrium*. In a Wound of the Tongue, which admits of no Suture, the Patient is to uſe Lambitives, ſuch as Syrup of dry'd Roſes, and Honey of Roſes: Or elſe, let the Yolk of a raw Egg be boil'd till it is almoſt hard; adding Syrup of dry'd Roſes, to make a Liniment. Afterwards, Take Waters of Plantane and Honey-ſuckles, of each 4 Ounces; Syrup of dry'd Roſes, and an Infuſion of Roſes, of each 1 Ounce and a half; and make a Gargariſm for the Tongue; and let the Patient continually keep in his Mouth, Sugar of Roſes, and Syrup of Quinces. Wounds of the Ear require dry Agglutinatives; and when the Suture is made, care muſt be taken, that the Needle do not make a puncture in the Cartilage, which would occaſion a Gangreen. In penetrating Wounds of the *Thorax*, Injections are to be made, with Honey of Roſes 2 Ounces, temper'd with Barley-water 6 Ounces, which the Patient is to take, leaning on the ſide of the Wound, while he makes an Expiration of Breach: You may alſo inject *Melicratum*, made of one part Honey, and two or three parts Water, diluted, with Agrimony-Water, or ſome other of the like Quality, in order to diſſolve the grumous Blood. Slight Wounds of the Lungs are to be deterg'd with Milk and a little Honey.

To ſtop the *Hemorrhage* or Flux of Blood, which immediately enſues upon Wounds, where there is an aperture of the great Veſſels, Arteries, or Veins: Take *Roman* Vitriol 1 Pound, Vinegar 2 Pound, *Bolus* and *Crocus Martis*, of each 1 Ounce; this *Crocus* alone, being ſometimes ſufficient upon theſe Occaſions: *Mercury* ſublimate, is alſo of great Efficacy, when mix'd with *Unguentum Populeum*; *Uſnea i. e.* the Moſs of Humane Sculls, or Elder-moſs, is likewiſe ſerviceable for the ſtanching of Blood. Otherwiſe, Take Quick-lime, white Vitriol and Aloes pulveriz'd, of each equal Parts; and ſtrew this Powder upon the Wound. Otherwiſe, apply *Crepitus Lupi*, well dry'd and preſs'd, or elſe ſteep'd in Vitriol of *Mars*, with half the quantity of Allum, in an Aſtringent Decoction, laying Canvas Bolſters over all. When the Wounds are deep, Powder of *Bolus Armena*, and *Terra Damnata*, of Vitriol is to be ſtrew'd upon the Part.

freſh

Terra Vitriolica, dulcify'd with *Terra Sigillata*, and the white of an Egg, *Usnea*, the fresh Dung of an Ass, mix'd with the dry'd Blood that issues from the Wound; Pledgets soak'd with *Allum* and Frogs-Sperm; or else *Crocus Martis* an Ounce, with *Terra Vitriolica* dulcify'd half a Dram, and Vinegar distilled from very strong Wine an Ounce, are the best Remedies. Cataplasms are usually made with Powders of Aloes, Dragons-Blood, *Bolus Armena*, and Whites of Eggs, all mingled together for this Purpose. Otherwise, ℞ Vinegar two Ounces, Colcothar a Dram, *Crocus Martis* two Drams; beat these together, and dip the Lint into this Compound, in order to lay it on the Wound, with *Crepitus Lupi* pulveriz'd: Take Care to make a good Bandage on the Part, to keep on the Medicine. Or else, you may mingle Meal-dust that sticks to Mills, and Powder of Worm-eaten Oak. The Potential Cautery is also very efficacious; which is made of equal Quantities of Vitriol and *Crepitus Lupi*, to be laid on a little Lint, and applied to the Place from whence the Blood runs out; taking Care to avoid touching with this Compound a Nerve or Tendon, which would raise Convulsions.

An Hemorrhage, proceeding from the Nostrils, may be stanch'd by Medicines taken inwardly, such as the following: ℞ Seed of Purslain, Plantain, Sorrel, Endive, and white-seeded Garden-Poppey, of each a Dram, Root of great Comfrey an Ounce: Let these be boil'd in a sufficient Quantity of Water, to the Reduction of nine Ounces, adding to the strained Liquor Syrups of Myrtle, Pomegranate, Poppey, and *Nymphæa*, of each half an Ounce, and mingling all together: The Juice and Seed of Nettles, *Hæmatites*, or Blood-stone, *&c.* are also used with good Success: Neither are Narcoticks or Soporatives to be omitted in Cases that are almost desperate: For Example; ℞ Seed of White-seeded Poppey half a Dram, White Hen-bane, and *Hæmatites*, of each a Scruple, Red Coral a Dram; mingle and pulverize these, to be given at one Dose in Conserve of Roses, six Drams. Or else let the Patient take Nettle-water an Ounce, with Powder of *Cranium Humanum* a Scruple; the Juices of Nettle, Purslain, Plantain, and Milfoil, may be taken in like Manner. As for Topicks, Swines-dung likewise mixed with Nettle juice is to be applied to the Nostrils, or else a Spunge dipp'd in Oxycrat, under the Arm-pits, while Piony-root is put under the Tongue, and *Nigella*-root chew'd, and thrust up the Nose.

For the Inflammation of Wounds, take Quick-lime, in which *Saccharum Saturni* and Camphire have been dissolv'd; the distilled Water of putrified Cray-fish, or else the Juice of Cray-fish has also a particular Virtue in this Case. In a Mortification, the Part is to be embrocated with Wine, wherein Wormwood, St. John's-Wort, Rosemary, and Aloes, have been boil'd; or else with Spirit of Wine impregnated with Camphire and Saffron.

Convulsions are prevented in asswaging the Pains of Wounds received in the Nervous Parts, by applying outwardly Oil of Earth-worms, with the distilled Oils of Amber and Bays; or else Ointment of Marsh-mallows, with Balsam of *Peru*, and distilled Oil of Lavender. But when the Convulsions are raised, the Patient is to make use of Medicines mix'd with Amber, and Volatile Salts extracted out of Animals. It is also proper to prescribe ten or twelve Drops of Spirit of Harts-horn, or of Humane Blood, or *Sal Armoniack*, to be taken Morning and Evening in a Spoonful of the following Julep. ℞ Earth-worms, and Dew-snails, of each six Ounces, compound Horse-radish-Water two Ounces, and Sugar three Ounces, to make a Julep. Otherwise, ℞ Powder of prepared *Millepedes* or Wood-lice three Drams, *Ammium*-seed a Dram, and having made the Mixture, order it to be taken in White-wine: Otherwise, let ten or twelve Wood-lice be beaten in White-wine, which you are to strain, and give the Liquor in two Doses.

For Topicks, begin at first with the most gentle Resolutives; such as Oils of Camomile, Anis, Goose-grease, *&c.* Sulphurous and dry Baths, or vaporous Baths, made of Decoctions of Sage, Rosemary,

Stœchas, *Chamæpitys*, Origan, and the like in Vinegar, are ſalutary in this Caſe; as well as Fomentations with Brandy, on the hinder Parts of the Head and Neck. If Fevers ariſe, which are uſually preceded by a Senſe of Heat in the Wound, let the Patient take Crabs-eyes in diſtill'd Vinegar, *Antimonium Diaphoreticum*, and Magiſtery of Coral, with Lemon-juice, or Spirit of *Sal Armoniack* in vulnerary Potions.

Remedies for Ulcers.

In order to cure Ulcers, the following Digeſtive is to be made uſe of; ℞ Turpentine an Ounce, the Yolk of an Egg, Honey of Roſes half a Dram and Oil of *Hypericum*, all mingled together; and when the *Pus* is formed, apply Medicines that ſerve to mundify, and abſorb the Acid: For Example; ℞ Tobacco leaves two Handfuls, Tops of Wormwood and *Veronica*, of each one Handful, round Birth-wort-root an Ounce, Juniper-berries half an Ounce Crude *Allum* a Dram, and let all boil in a ſufficient Quantity of Forge-water, in order to pour the ſtrained Liquor into the fiſtulous and ſordid Ulcer. Otherwiſe, take Juices of Tobacco, Plantain, Wormwood, and Betony, with Honey of Roſes, of each four Ounces; let all be beaten together over a gentle Fire, adding *Crocus Martis*, Mercury Precipitate, Aloes, Myrrh, and Flowers of Sulphur, of each a Dram, with as much Balſam of *Peru* as is needful to make a Mundificative Ointment. The Ulcer is to be conſolidated with Quick-lime, waſh'd twice or thrice, and afterward dried, to be mix'd with Linſeed-oil, and a little *Bole Armoniack*. The *Caries* of the Bone may be corrected by ſprinkling thereon ſome Drops of rectified Spirit of Wine, or diſtilled Oils of Cloves and *Guayacum*; or by ſtrewing upon the Part Powder of *Euphorbium* and Orrice-root. Or elſe take Litharge of Gold two Ounces, Oil of Roſes a Pound; boil theſe in a Glaſs-Veſſel, and afterward put in new Wax three Ounces, Liquid *Styrax* one Ounce, Honey an Ounce and a half: Let all boil together, that they may be well incorporated; and having removed the Veſſel from the Fire, add Powders of Frankincenſe and Myrrh, Mercury Precipitate, Oil of Turpentine, Wax, and Pine-tree Roſin, of each an Ounce.

In an Ulcer, where the Heat is conſiderable, waſh the Part affected with Plantain-water or Roſe-water, &c. and then apply a refrigerating, deſiccative, and incarnative Ointment, ſuch as the following, which is approved of eſpecially in Ulcers of the Legs: Take Ceruſs an Ounce, Litharge an Ounce and half, Maſtick, red Coral, Ointment of Roſes, Dragons-blood, Camphire, of each half an Ounce, *Unguentum Populneum* ſix Drams, Oils of Roſes and Violets, Waters of *Solanum* and Plantain, as much as is requiſite, with a little *Lapis Calaminaris* and Cuttle Bone, to make an Ointment.

For ſmall Ulcers that cauſe an Excoriation of the Skin and Fleſh, it would be advantagious to uſe at firſt a Plaiſter of Ceruſs, Litharge of Gold, Myrrh, and Oil of Roſes, all boil'd together to a proper Conſiſtence. During the Uſe of this Medicine, the excoriated Parts are to be waſhed from Time to Time with the Juice of Groundſel, and then ſtrew'd with the Powders of long Birth-wort and Bay-berries. Laſtly, having ſoak'd Pledgets in Groundſel-juice, in which the preceding Powder has been diſſolv'd, they are to be rolled about the Part, and the Malady will be cured in a ſhort Time. Or elſe take Wax and Roſin, of each an Ounce, Mutton-ſuet two Ounces, Ship-pitch, and Olive-oil, of each three Ounces, Maſtick and Franckincenſe, of each three Drams, Litharge an Ounce and half, and Ceruſs half an Ounce: Let the Oil, Roſin, Suet, and Wax, be boil'd together till the Mixture becomes very glutinous, and then ſlip in the reſt; taking Care to bathe the Ulcer every third Day with warm Wine. You may alſo apply a *Sparadrap* prepared thus: Take Oil of Roſes twelve Ounces, Ceruſs three Ounces, Litharge four Ounces and half, Frankincenſe and Maſtick, of each a Dram; Dragons-blood half an Ounce,

Myrtle-berries and *Sarcocolla*, of each two Drams, the whole Compound is to be boil'd a little, till it turns to a red Colour, and the Cloth dip'd therein when it is taken off from the Fire.

Otherwiſe, take Litharge two Drams, Ceruſs three Drams; let theſe Ingredients, after they have been pulverizid, be ſteep'd in Roſe-water, and having dried them, add prepared Tuty and *Pompholyx*, of each a Dram and half, Lead burnt and waſhed two Drams: Theſe are to be reduced to a very fine Powder, and put into an Infuſion made of Gum Dragon in Roſe water, in order to add Goats-ſuet two Ounces, and make a Plaiſter, with Camphire a Scruple. It is alſo expedient to ſtamp green Leaves of *Carduus Benedictus*, and boil them in Wine; afterward adding liquified Boar's-greaſe, and mingling the Whole with a ſufficient Quantity of Wheat-flower, to make a ſomewhat thin Ointment, with which the Part is to be anointed twice a Day

Several Practitioners in Surgery uſually dreſs Ulcers of the Arms and Hands with ſuch Medicines as theſe, *viz.* Take Wax a Pound, Ceruſs eight Ounces, Oil of Roſes a Pound; *Sal Armoniack* three Ounces, Braſs-Scales two Ounces, Frankincenſe, *Allum*, Verdegreaſe, Quick-lime, of each an Ounce, which being melted, are to be mix'd with Wine, and boil'd all together, to make an Ointment. Or elſe take Oil of Sulphur three Ounces, *Colophonia* three Ounces, Wax half an Ounce: Theſe Drugs being melted, and well mix'd together, put in Myrrh pulveriz'd fine to the Quantity of the ſaid three Ingredients, and boil the Mixture over a gentle Fire, from whence it is to be taken off in a Quarter of an Hour; and having ſet it by to cool, you'l have a Plaiſter of great Efficacy for ſeveral Sorts of Ulcers, eſpecially if they be waſhed every other Day with the following Water: Take Plantain-water a Pint, Roſe water half a Pint, Orange-flowers three Ounces, Mercury Sublimate pulveriz'd half an Ounce, and let theſe boil a Quarter of an Hour over a ſlow Fire. You are to keep this Water in a Glaſs-bottle, to be uſed as Occaſion ſerves.

In deep and fiſtulous Ulcers, as in the Back, or elſewhere, Injections are to be made, with a Decoction of Barley two Pounds, and Honey of Roſes four Ounces; for a greater Mundificative, mingle it with *Unguentum Ægyptiacum*, and two Days after with Brandy, two Ounces. Otherwiſe take *Lignum Sanctum* with its Bark two Ounces, pulveriz'd fine, long Birth-wort, the leſſer Centory, Wormwood, Agrimony, Horſe-tail, Olive-leaves, Pimpernel, great Comfrey, of each one Handful, Frankincenſe, Myrrh, *Sarcocolla*, of each half an Ounce, perfumed red Wine three Pints, clarified Honey four Ounces. Let a Decoction be made of all theſe Ingredients, and then inject the ſtrained Liquor into the Ulcer with a Syringe, adding at that very Inſtant an Ounce of Brandy for every Time the Injection is made.

When you would Incarnate the Ulcer, take Plantain-leaves two Handfuls, Agrimony, Herb-*Robert*, and Cinquefoil, of each one Handful, three Wormwood-tops, Horſe-tail, Ceterach, St. *John's*-wort, both Sorts of Comfrey, of each half a handful, Betony one handful and a half; mingle theſe, and make a Decoction of them in Water, adding at the end, Aſtringent, red Wine one Quart, red Roſes and Myrtle-leaves, of each two Pugils, whole Barley half a handful: Then ſtrain all, and into two Quarts of the Liquor, put Bean-meal an Ounce, *Orobia*-meal half an Ounce, Frankincence, Maſtick, *Sarcocolla*, Pine-tree Roſin, of each an Ounce, Myrrh, *Florence*-Orrice and round Birth-wort, of each half an Ounce, Honey of Roſes ſtrained three Ounces. The Mixture made of all theſe Ingredients is to be injected into the cavernous Ulcer, which you may cover with a Plaiſter compounded of Litharge of Gold ſix Ounces, Oils of Roſes and green Olives, a Pint and a half, and Vinegar Roſes of half a Pint. Boil theſe together over a gentle Fire, ſtirring them continually with a *Spatula*, till the Compound has contracted a black Colour, and the Conſiſtence of a Cerate, to make a Plaiſter.

For a Tortuous Ulcer, take Oil of bitter Almonds, Juice of Sevil-Oranges, and Malmſey-Wine, of each half an Ounce, Powders of *Coloquintida* and leſſer Centory, of each two Drams, with a ſufficient Quantity of Wax. When the Bone is corrupted, the following Powder may be uſed to good Purpoſe; Take round Birthwort, Orrice, burnt Aloes, Root of *Peucedanum*, Braſs-droſs, Pine-tree-Bark, of each an equal Quantity; let theſe be pulveriz'd, and add Honey to make a Plaiſter.

If the Edges of the Ulcer are become callous it will be proper to make uſe of *Wuricius*'s Brown Ointment, or *Unguentum Ægyptiacum*, with Balſam of Sulphur, Turpentine, and Camphire: Or elſe take *Unguentum Ægyptiacum* half an Ounce, Mercury Precipitate a Dram, Plantain-water four Drams, Roſe-water two Ounces: When all is boil'd together to the Diminution of a third Part, ſpread ſome of this Ointment upon the Pledgets which are to be apply'd to the Aperture of the Ulcer. The two following Plaiſters are ſerviceable for a great Number of Ulcers; Take Maſtick an Ounce, *Venice*-Turpentine three Ounces, yellow Wax four Ounces, and give all the Form of a Plaiſter. Or elſe take Betony, Agrimony, Vervin, and Pimpernel, of each one Handful, Wax, Turpentine, and Roſin, of each one Pound, Maſtick one Scruple, beſt White-wine three Pints: Boil the whole Compound to the Conſumption of a third Part, and ſtrain it, to make another Plaiſter.

Ulcers of the Eye, which appear as white Specks, when they are in the Corneous Tunicle, or as red Specks, when they are in the White of the Eye, are cured with Anodyns and Deterſives, ſuch as Sugar, Honey, Saffron, Myrrh, and Frankincenſe; a little Vitriol diſſolv'd in a conſiderable Quantity of Roſe-water, is one of the beſt Deterſives: Or elſe take three Parts of Strawberry-water, diſtilled with one Part of Sugar in *Balneo Mariæ* during eight Days, and add an Infuſion of Rue and *Marrubium* in Eye-bright-Water, into which has been put *Sarcocolla* and Aloes in a Rag ty'd up into a Knot, which is to be afterward ſqueezed out. Verdegreaſe is good for an Ulcer in the *Caruncula Lachrymalis*.

An Ulcer of the Ear is mundified with Juice of Beet and Hore-hound, Oil of bitter Almonds, Juice of Onions, with Honey of Roſes, and the Juices of *Arum* and Piony. The *Pus* or Matter that iſſues out of it is to be taken away with Wool, and then it is requiſite to put in a ſmall Probe cover'd with Cotton, which has been at firſt ſoaked in Water mix'd with Honey, afterwards in Wine, and at laſt in Oxymel. The Pain of the Part may be aſſwaged by putting in ſome Drops of an Infuſion of Frankincenſe made in Milk.

Ulcers of the Noſe are ſometimes cured with Juice of *Naſturtium* and *Allium*, and ſometimes with *Sal Armoniack* and Vinegar. Or elſe, take red Roſes, Myrtle-berries, *Calamus Aromaticus*, *Angelica*, Gentian Mace, and Cloves, of each half a Dram, Camphire and Amber, of each four Grains, and Muſk ſix Grains; let all theſe be pulveriz'd, and ſnuft up the Noſtrils.

In an Ulceration of the Mouth, the Part is to be waſhed with Damask Roſe-water, or elſe with a Mixture of Water and Milk. The following Decoction may alſo be uſed for the ſame Purpoſe; Take Marſhmallow root, and cleans'd Barley, of each an Ounce, Quince-ſeeds half an Ounce; boil theſe in a ſufficient Quantity of Water till it is reduced to a Quart, and make a Gargariſm.

In Serpentine Ulcers of the Mouth, Gums, and Throat, take Verdegreaſe or Copper-ruſt a Dram, and Orpiment a Dram and a half; let theſe be pulverized, and boil'd in White-wine four Drams, to the Conſumption of one half. The Decoction being cool, put in Waters of Roſes and *Solanum*, or of Plantain, of each an Ounce and a half, to make a green Water, with which you are to waſh the Ulcers. If the ſame Parts are ſeiz'd with Venereal Ulcers, take Plantain-water one Quart, *Unguentum Ægyptiacum* four Ounces, and waſh thoſe Parts with this Liquor. For the Hemorrhage of the Ulcers, take Mealduſt mix'd with *Bolus* and Dragons-blood,

and

and put a great deal of this Mixture into those Cavities.

For Ulcers that break out in the *Præputium*, and Glands in Venereal Diseases, take *Unguentum Basilicon* six Drams, Ointment of Tobacco two Drams, Precipitate wash'd in red Rose-water half a Dram; mingle all together, and having made a Liniment, spread it upon the Lint, which is to be apply'd to the Ulcers after they have been bathed with the following Fomentation; Take Roots of Marsh-mallows and Lillies, of each an Ounce and a half, Leaves of common Mallows, White Mullein, and Hen-bane, with Camomile-flowers and Melilot, of each a Handful, Seeds of Line and Fenugreek, of each half an Ounce; and let all boil in a sufficient Quantity of Spring-water, in order to foment the affected Part.

An Ulcer of the *Intestinum Rectum* may be cured with the following Balsam: Take Flowers of *Tapsus* and *Hypericum*, and Leaves of *Prunella*, of each a Handful; boil these in the press'd Oil of St. *John's*-Wort-Seeds with an equal Quantity of old red Wine, till the Wine be evaporated, so that a Drop of the Liquor let fall upon the Fire rises up in a Flame without any Crackling, and then the Medicine will be brought to Perfection.

In order to cure an Ulcer of the Reins, accompany'd with Sharpness of Urine, the Patient, must take a laxative Medicine; such as a *Bolus* made by mingling Extract of *Cassia* an Ounce, and Turpentine wash'd in Violet-water a Dram and a half, with a little Sugar and Liquorish pulveriz'd. Afterward the following Apozeme is to be prepared: Take cleans'd Barley a Pugil, Lettice, Mallows, Purslain, Violet-plants, Wild Succory, of each a Handful, of the four greater cold Seeds, a Dram and a half of each, Violet-flowers and *Nymphæa*, of each a Pugil, white Poppey-seed two Drams, Jujubes and Sebastens, six of each: Having made a Decoction of all these Ingredients, you are to dissolve in a Pint of the strained Liquor Syrup of Violets and *Nymphæa*, of each an Ounce, with Syrup of Maiden-hair and Poppey, of each half an Ounce, to compleat the Apozeme. Afterwards the following Electuary is to be taken for a Week: Take Sugar of Violets four Ounces, Conserve of Roses made a Year ago half an Ounce, Mallow-seed two Drams, white Poppey-seed one Dram, the four cold Seeds a Dram and a half of each, white Hen-bane-seed two Scruples, Powder of Liquorish three Drams, Seed of *Alkakengi*, with their Pods dried, four Scruples, Liquorish-juice half an Ounce, *Bolus Armena* and Trochisks of *Terra Sigillata*, of each half a Dram: Make up the Electuary compounded of all these Ingredients with Syrup of Maiden-hair and Violets, and let the Patient take every Day a Quantity of it, about the Bigness of a Chess-nut; and at last, you are to prescribe Cows-milk, with a little *Bole-Armoniack*, and Conserve of Roses.

If there be an Ulceration in the Bladder, let the Patient take every Day three Pills made of *Venice*-Turpentine wash'd in Horse-tail-water two Drams, Powder of Liquorish one Dram, and Juice of the same half a Dram. And for Ulcers, as well in the Reins as in the Bladder, the following Trochisks are much recommended: Take *Bolus Armena*, Dragons-blood, *Spodium*, red Roses, Myrrh, of each half a Dram, Gum-*Arabick*, Gum-Dragon, cleans'd Barley, Myrtle-berries, and Liquorish, of each two Drams, Seeds of white Poppey, Cotton-weed, Purslain, and Quinces, of each one Dram, with a sufficient Quantity of the Mucilage of Flea-bane-seed, prepared in Plantain-water, to make Trochisks, the Dose of which is to be from a Scruple to a Dram, dissolv'd in Goats-milk, or in a Decoction of Barley: It would also be expedient to make Injections of this Liquor into the Bladder. Some prescribe, with good Success in the same Maladies, File-dust of Steel, liquified and macerated in strong-body'd sweet Wine, to be taken in the Morning in Maiden-hair-water, or in Ass's-milk.

For Ulcers in any Member of the Body whatsoever, you may make use of Water of Plantane and Allum; or else *Ægyptiacum* and Treacle infus'd in Spirit of Wine;

Pledgets

Pledgets ſoak'd in Wine, in which Gunpowder has been diſſolv'd to waſh the Ulcers, are likewiſe very beneficial in this Caſe. Or elſe, Take *Saccharum Saturni*, Camphire and Soot, and having incorporated them together, with the Juice of Sowthiſtle and Plantane, in a leaden Mortar, make a Liniment, in order to anoint the Part gently, which is to be afterward cover'd, with a ſimple Canvaſs Pledget, or a Leaf of Cap-Paper. Otherwiſe, let Water of diſtilled rotten Apples be mix'd with the extract of round Birth-wort Roots made in Spirit of Wine, and take it for an Injection. In general, the Remedies which are proper to mundifie and deſiccate Ulcers, may be reduc'd to Liquors; as the Waters of Bryony-roots, great Celandine and Lime; the Tinctures of Myrrh, Aloes and Saffron; and Whay, in which *Saccharum Saturni* has been diſſolv'd: Or elſe, Powders, ſuch as thoſe of Allum and Cinnabar, which are burnt to make a Fumigation about Ulcers, by means of a Funnel, Meals of ſeveral ſorts, and Powder of worm-eaten Oak: Or elſe, Ointments or Plaiſters, as that of Betony, *Emplaſtrum Diaſulphuris*, *Deſiccativum Rubrum*, &c. An Ointment may be alſo prepar'd with three Yolks of Eggs, Honey half an Ounce, and a glaſs of Wine; beaten all together. Otherwiſe, let Lime waſh'd and dry'd ſeveral times, be mix'd with Oil of Linſeed and *Bolus*; and to render it more Deſiccative, add a little Precipitate thereto.

A *Lapis Medicamentoſus* may alſo be made, which is of ſingular uſe, as well in Ulcers as Wounds: For that purpoſe, Take green Vitriol 1 Pound, white Vitriol half a Pound, Allum 1 Pound and a half; *Anatron* and common Salt, of each 3 Ounces; Salts of Tartar and Wormwood, Mugwort, Succory, *Perſicaria* and Plantane, of each half an Ounce, put theſe into a glaz'd earthen Pot, drop in a little Vinegar of Roſes, and let all boil over a gentle Fire, ſtirring them about often. When the whole mixture begins to grow thick; add *Venice*-Ceruſs half a Pound, Bole-Armoniack 4 Ounces, and mingle all theſe Ingredients together, till the heat of the Fire has brought them to the hardneſs of a Stone: Then removing it from the Fire, break the Pot, and take out the whole Maſs, which is to be kept for uſe: If you think fit to put Myrrh and Frankincenſe into this Compound, it muſt be boil'd over a ſlow Fire, leſt theſe Gums ſhould burn, and loſe their Virtue.

This Preparation is alſo made after another manner, *viz.* Take Vitriol one Pound, Nitre half a Pound, Ceruſs, Allum, Bole-Armoniack, of each four Ounces; Ammoniack two Ounces; pulverize all, after having before ground the Ceruſs and Bolus on a Marble-ſtone, and let them ſimper gently in an earthen Veſſel, till the matter be petrified. Otherwiſe, Take Allum four Ounces, Vitriol of *Hungary* two Ounces; white Vitriol, Tartar, Borax, Maſtick, Frankincenſe, Sal Armoniack, of each one Ounce; Ceruſs ſix Ounces, *Bolus Armena* three Ounces; let all theſe be beaten groſs, and boil'd over a ſlow Fire, with ſtrong Vinegar in a glaz'd earthen Pot. When there is occaſion to make uſe of this Stone, an Ounce of it is to be diſſolv'd in a Pint of Water, which muſt be ſtrain'd, to ſoak the Pledgets, that are laid Night and Morning on the Cavities, in which ſome of this Liquor is alſo drop'd. But its Acrimony hinders it from being us'd in the Ulcers of Nervous or Inflamed Parts, as well as in cancerous Ulcers.

Remedies for Burns.

Superficial Burns are ſometimes cur'd by a ſpeedy Application of Dirt or Mud upon the Part; an Ointment may alſo be made for them, with Bay-leaves ſtamp'd, and boil'd in Hogs-lard, to rub the burnt Parts: or elſe, Take Honey and Wheat-flower, of each equal Parts; with the Yolk of an Egg; then beat theſe together, and lay them on the part Affected. Or elſe make a mixture of Oil of St. *John*'s-wort one Ounce, with Lime quench'd and well waſh'd two Scruples, and anoint the Part with

with it. Others cauſe Ivy-leaves to be boil'd in Water or Beer, and apply them Hot.

In Burns of all the Parts of the Body, except the Face, this Ointment may be made uſe of. Take Liquid Soap half a Pound, raw Onions two Ounces, Salt one Ounce and a half, Oil of the Yelks of Eggs one Ounce, Oil of Roſes and ſweet Almonds, of each 3 Ounces; Mucilage of Quince-ſeeds two Ounces; and make an Ointment of theſe over the Fire. For an Anodyne *Collyrium*, Take Roſe-water three Ounces, Plantane-water one Ounce, Seeds of Quinces and Fenugreek, of each one Ounce; Mingle theſe together, and let them infuſe over hot Aſhes, during an Hour. Afterwards having ſtrained the Liquor, put in a little Breaſt-milk, and let this Medicine be drop'd hot into the Eyes. For the other parts of the Face, you may apply the following Ointment. Take Gum *Elemi* one Dram, Oil of Egg-yolks and Roſes, of each three Drams; and *Venice*-Soap two Ounces: Then having diſſolv'd the Gum in the Oils; mix all in a Mortar, to make an Ointment, which is to be ſpread upon a Linnen-cloth, in order to cover the whole Face.

For Burns made by fir'd Gun-powder, Spirit of Wine or Brandy, or Olive-Oil beaten with Salt, Juice of Onion and Verjuice, is a good Remedy, when they are Recent; and if they be only ſuperficial, Take Quick-lime, two Pugils, with the like weight of Milk-cream, and clarify'd Honey, to be mix'd and brought to the conſiſtence of an Ointment: Or elſe, put Quick-lime into common Water, ſo as the Water may riſe four Inches above the Chalk, and when the Effervеſcence is over, pour in Oil of Roſes, to form a kind of Butter, which is to be laid upon the Part. Or elſe, Take raw Onions one Ounce and a half, Salt and *Venice*-Soap, of each half an Ounce: Let all be beaten in a Mortar, and a ſufficient quantity of Oil of Roſes ſlip'd in, to make an Ointment: Otherwiſe you may mingle ſtamp'd Crayfiſh with Freſh-butter; then boil and ſcum the Mixture, till a red Ointment is produc'd, which muſt be ſtrain'd before it is us'd. The Mucilages of Quince-ſeeds, prepar'd with Frog-ſpawn, and mix'd with *Saccharum Saturni*, is alſo a proper Remedy. If the Burn be accompany'd with ſmall Bliſters: Take green Sage-leaves a Handful, Plantane two Handfuls, Freſh-butter ſix Ounces, Pullets-dung three Ounces; let the whole compound be fry'd a quarter of an Hour, and afterward preſs'd out, in order to be kept as a Liniment of great Efficacy. If the Skin be ulcerated, apply an Ointment made of the inner Bark of Elder, boil'd in Olive-Oil; adding after the Liquor is ſtrain'd, two parts of Ceruſs, and one part of burnt Lead, with as much Litharge, all ſtirr'd in a leaden Mortar. Otherwiſe, Take Butter without Salt, *Unguentum Baſilicon*, Oil of white Lillies and Egg-yelks two Drams, and make an Ointment of the whole Maſs; which you are to lay upon the part Affected, after it has been waſh'd before, with a Decoction of Fenugreek and Melilot-flowers. The following Anodyne may be likewiſe us'd to very good purpoſe. Take Oil of ſweet Almonds, Ointment of Roſes, and white Wax, of each one Ounce Let theſe be diſſolv'd together, and then add Camphire one Scruple, with a little Mucilage of Quince ſeed, to make up the Ointment.

In caſe the Burn has penetrated very far, and it is apprehended leſt the Humours and Blood ſhould fall upon the Part, recourſe may be had to Deterſives, ſuch as the following, *viz.* Take *Bolus Armena*, Dragons-blood, Gall-nuts, *Crocus Martis*, and *Acacia*, of each half an Ounce, Oil of Roſes three Ounces, and new Wax one Ounce and a half; make an Ointment of theſe, adding a little Vinegar: Or elſe take Barley-meal, Clay or Loam, with which Ovens are made, of each two Ounces: Boil theſe in Vinegar and Water, to the conſiſtence of a Cataplaſm; and then mix the Compound with two whites of Eggs. The Application of this Remedy muſt be repeated twice a Day, of which a Plaiſter is to be made, about as large as the Palm of one's Hand, to cover the moſt diſtem-

per'd

per'd Part; and the following Ointment muſt be laid upon the entire Part: Take *Unguentum Baſilicon* one Ounce, Oil of Roſes and white Lillies, of each half an Ounce; and the Yelks of two Eggs; and let theſe Ingredients be mingled together, to make the Medicine compleat. To diſſolve the Humours that are lodg'd in the Part, Take freſh Butter and Hens-greaſe, likewiſe freſh, of each one Ounce, new Wax, and Oil of white Lillies, of each half an Ounce. When theſe are melted over the Fire, you are to add Saffron one Scruple, and Mucilage of Quince-ſeeds one Ounce, in order to beat the whole in a Mortar, and make an Ointment.

The following Remedy may ſerve for all ſorts of Burns: Take freſh Butter waſh'd in Roſe-water three Ounces, Oils of Violets, Egg-yelk, and ſweet Almonds, of each half an Ounce, Barley-meal one Ounce and a half, Saffron one Dram, Quince Mucilage one Ounce, with a ſufficient quantity of Wax, to make an Ointment: But foraſmuch as Burns in the ſurface of the Body, excite great Pains, when they are mundify'd; ſome are ſo provident as to cover the Ulcers with a very fine and thin piece of Linnen, which they do not take away in dreſſing the Part, till theſe Maladies come near their perfect Cure; the *Pus* having liberty to iſſue out through the Pores of that Cloth, which likewiſe gives paſſage to the Energy of the Medicine. When a Cruſt is form'd, prepare a Liniment of freſh Butter, beaten in a Leaden Mortar, with a Decoction of Mallows; and ſpread it on very hot Cabbage-leaves, with which the Eſcar is to be cover'd, after the Bliſters are prick'd.

To conſume the Excreſcences of Fleſh occaſion'd in Ulcers, by the moiſtneſs of the Medicines, or the abounding of nutritious Juice: Let Crude-allum, and Verde-greaſe, of each two Ounces, be boil'd in Wine eighteen Ounces; which being reduced to a fourth Part, you are to ſtrain the Liquor, and add Camphire one Dram, diſſolv'd in Spirit of Wine one Ounce. It is alſo adviſable to make a corroſive Powder, which is of admirable Efficacy for diminiſhing ſuperfluous or proud Fleſh: Take Pomegranate Rinds, Gall-nuts and burnt Spunge, of each an equal Quantity; to be pulveriz'd, and ſtrew'd over the Part, on which this compound Powder muſt be kept by means of ſome particular Plaiſter. *Unguentum Ægyptiacum* is alſo very ſerviceable for this purpoſe; ſince it conſumes the Fleſh, without cauſing Pain, or troubleſome Prickings; as well as the Powder but now preſcrib'd. *Unguentum Apoſtolorum* is no leſs recommended, as well as the ſingle Powder of Hermodactyls, or of Daffodil-husks: Or elſe take pulveriz'd *Crocus* of Metals, at Diſcretion, which ſpeedily conſumes ſoft and ſuperfluous Fleſh. Excreſcencies which ſometimes ariſe in the roof of the Mouth, after an Excoriation, may be cur'd by touching the Tumour with Oil of Vitriol.

When the Malady degenerates into a Gangreen, the ſpreading of it may be ſtop'd, both by Internal Remedies; as Spirit of Wine impregnated with Camphire, Preparations of Lemmon with the ſame Gum, Spirit of Elderberries, Spirit of Harts-horn, Theriacal Spirit camphirated, *&c.* And by External Remedies; ſuch as Pledgets ſoak'd in Theriacal Spirit with Camphire, and ſtrewings of Aloes and Myrrh pulveriz'd; or a Decoction of Quick-lime, to which are added *Mercurius Dulcis*, and Spirit of Wine: Likewiſe a Decoction of Sal Armoniack in the Patient's Urine; or a Decoction of Antimony-*Scoria* in Vinegar; or elſe a Decoction of the *Caput Mortuum* of *Aqua-fortis* diſtill'd with Roſe-water, *&c.* in which Decoctions the Pledgets muſt be alſo dip'd before they are laid on the Part. If the Gangreen proceeded from Cold, it would be expedient to rub the part Affected with Snow, and let the Patient drink Treacle infus'd in Wine, to cauſe Sweating; and the coldneſs being ſomewhat diminiſhed, gentle Frictions are to be made with Oil of bitter Almonds, as well as Fomentations with Milk, or elſe with a Decoction of Roſemary.

In a *Sphacelus*, you are to ſtrew Powders of Orrice Root, Gentian, *Ariſtolochia*, Centory,

Centory, Pine-tree-Bark, Myrrh and Ceruſs; and if the diſeaſed Part be entirely depriv'd of Senſe, it muſt be ſeparated from the Sound, by means of a hot Iron, or Butter of Antimony, with which a Circle is to be made round the Gangreen. In caſe the *Sphacelus* be not very conſiderable, you are to bathe with Spirit of Wine and Vinegar the Parts that have been Scarify'd, and afterward anoint them with *Unguentum Ægyptiacum*, or *Hartman*'s Liniment; made of *Mercury* Precipitate, boil'd to a moderate Conſiſtence in Oil of Walnuts. During this Courſe, apply to the Sore and other Parts near it, Compoſitions of *Scordium*, Wormwood, Juniper-berries, Myrrh and Aloes, boil'd in Vinegar or Wine; adding Allum, Vitriol, and Sea-Salt.

If the Gangreen proceeds from an Inflammation, the following Defenſative is to be laid on the Part. Take Barley-meal four Ounces, *Bolus Armena* two Ounces, Powders of green Gall-nuts, Cypreſs-nuts, and Pomegranate Rind one Dram and a half; Camphire one Dram, with Oxymel, to make a Cataplaſm, which muſt be apply'd to the Gangreen. Some Surgeons forbid the Application of Oils, leſt by ſtopping up the Pores, and hindering inſenſible Tranſpiration, the Matter of the putrid Vapours ſhould be repell'd inward. The Fleſh muſt be ſcarify'd more or leſs deep, according to the ſituation and bigneſs of the Gangreen; and when by this Operation, a little Blood has been drawn from the Part, Leaches are to be apply'd, after which you are to bathe the Part with Vinegar and Sea-Salt, mingled together, to prevent Putrefaction.

But if the Gangreen be ſpread very far, a more efficacious Lotion is to be us'd, ſuch as this, *viz.* Take a ſtrong *Lixivium*, and good Vinegar, of each three Pints; *Scordium*, both ſorts of Wormwood, Rue, and Lupins, of each half a Handful; all ſtamp'd; round Birth-wort-Root, and *Vincetoxicum*, of each half an Ounce; Sea-Salt four Ounces: Let theſe be boil'd in a ſufficient quantity of Water, to the conſumption of a third Part; and in the ſtrained Liquor, diſſolve Aloes, and Myrrh, of each half an Ounce; Brandy two Ounces, Camphire half a Dram, and make a Fomentation, bathing the Part with this Liquor, which is to be warm'd as often as you make uſe of it; and afterward the entire ſcarify'd Part muſt be cover'd with a Plaiſter of *Unguentum Ægyptiacum*. Otherwiſe, Take Verdegreaſe four Ounces, Honey clarify'd, with a Decoction of Wormwood and *Scordium* ſixteen Ounces, Vinegar of Squills ſix Ounces, Roche-allum, and Sal Armoniack, of each one Ounce; Juice of Rue, both kinds of *Scordium*, and *Alliaria*, of each three Ounces: Boil all theſe till the Honey grows thick, and then mix them with Treacle and Mithridate, of each half an Ounce; Camphire one Ounce, and make an Ointment to be laid on the Part affected.

The following Cataplaſm reſiſts Putrefaction, dries up the excrementitious Humours, and aſſwages the Pain. Take Lupin-meal, Lentils, Beans, *Lolium* and Sea-Salt, of each three Ounces, Powder of Wormwood-tops, both kinds of *Scordium*, *Alliaria*, Rue, of each one Ounce. Theſe are to be boil'd in Oxymel, and a Cataplaſm made of them; adding when it is cooled, Aloes and Myrrh, of each one Ounce; and Brandy three Ounces. In the Preparation, care muſt be taken, not to let the Meals boil too long with the Powders, which would make the Medicine more viſcous than is requiſite: When it is us'd, it muſt be always heated again a little; and you muſt not fail to envelope the Part in warm Linen-cloths, to bring back the native Heat.

The laſt Remedy to ſtop the progreſs of the Putrefaction, is the actual Cautery, or Red-hot Iron, apply'd to the Gangreened Fleſh, ſo as to produce an Eſcar or burnt Cruſt, which muſt be ſeparated, as ſoon as is poſſible, by ſome ſort of Ointment, ſuch as the following: Take Cich-meal, round Birth wort Root, *Florence*-Orrice, *Vincetoxicum*, and *Angelica*, of each half an Ounce; Treacle two Drams, with as much Honey of Roſes, as is needful, to make an Ointment, after the uſe of which the Ulcer is to be mundify'd with the following Medicine. Take Juices of

Smallage, *Scordium*, *Arnogloſſum*, Rue, of each four Ounces, and Honey of Roſes 1 Pound: Boil all theſe to the conſiſtence of Syrup; and then mingle all with Lupin-meal, Powder of round Birth-wort, *Angelica*, *Vincetoxicum*, Treacle, of each half an Ounce; Brandy one Ounce, and give all the form of an Ointment, which is to be kept for uſe in a Glaſs Veſſel.

But if the Gangreen came by travelling long on the Road, in very cold Places, endeavours muſt be us'd to revive the Part, by means of the following Medicines. Take Powder of Muſtard-ſeed one Ounce, Cloves three Ounces, Oil of Linſeed, and Walnuts a ſufficient Quantity, and mingling all in a Mortar, make a Plaiſter to be laid on Hot. Otherwiſe, Take one Garden Horſe-radiſh Root, and one common Radiſh-Root: Let theſe be pounded in a Mortar, adding Muſtard one Ounce, Cloves pulveriz'd three Drams, Oil of Linſeed, and old Walnuts, as much as is neceſſary for a Plaiſter, which muſt be apply'd Hot, and kept on the Part for a Day in a warm Place. Sometimes a Gangreen has been taken away, by a Lotion made with Water, in which Lime and white Chalk have been boil'd.

In a great Putrefaction, care muſt be taken to embrocate with Spirit of Sulphur, the Parts that have been ſcarify'd deep; then they are to be fomented with Spirit of Wine, in which Powder of Aloes and Myrrh have been infus'd. Afterward it is requiſite to ſtrew a great deal of the ſame Powders upon the entire Part, and cover it again with Pledgets ſoak'd in Spirit of Wine; which will cauſe the burnt Fleſh to be ſeparated from the Sound; eſpecially if this ſeparation be promoted by the uſe of a Digeſtive, made of Egg-yelks, Turpentine and Honey. Laſtly, if the Part be entirely ſeiz'd with a *Sphacelus*, that is to ſay, totally depriv'd of Senſe and Life, there is an abſolute neceſſity of proceeding to the Amputation of the Member, to prevent the corrupting of the reſt of the Body by the Contagion.

The End of the Third and Laſt Volume.

A Compleat

Alphabetical Index

To the First, Second, and Third

VOLUMES

OF

Bibliotheca Anatomica, Medica, Chirurgica, &c.

A.

VOL. I.

ABſceſs in the Foot. By *Wiſeman* *Page* 611
Abſceſs under the Nail. *Dion* 394
Amputation of Members. *Verdun* 490
Amputations. *Dion* 503
Amputation Inſtruments 509
Amputation of the Arm. *Le Clerk* 488
Anatomy. *St. Hilaire* 48
Anthropogeniæ Ichnographia. *Kerkering* 266
Arm blooded. *Dion.* 376
Arm of a Fœtus. *Coiterus* 264
Articulation of the Bones. *Le Clerk* 134
Arteriotomy, or opening an Artery. *Dion* 376
Aſthma and its Cure 63, 634
Aſtralagus. *Le Clerk* *Page* 130
Auditory Bones. *Spigelius* 148

VOL. II.

Abdomen, its Parts and Diſeaſes. 5, 485, 516
Abſceſs open'd. 357
Alopecia. 679
Anaſarca. 550
Anatomy. 1
Anatomical Inſtruments. 2
Anatomy of the Eyes. 37
Anatomy of the Brain. 639
Aneuriſm. 423
Anthrax. 374
Apoplexy. 668
--- Its Cure. From *St. Hilaire, &c.* 683
Aqueous Humour of the Eye. 156
--- Unnatural Superfluity. 188

Arteries Page 340
Arteries. *Cowper* 405
Aſpera Arteria. 603
Aſthma, and its Cure. 632, 634
Atrophy. 549
Atrophy of the Eye. 192

VOL. III.

Abortion 374
Animal, its Formation from an Egg. 355
Animal Secretion 177
Animal Spirits 89
--- Diſeaſes that have a Relation to them 106
Anus, Operations to be perform'd on it 461

B.

VOL. I.

BAndages. By *Petit* Page 666
Bandages. *Verdun* 452
Bandages. *Dion* 431
Bandages. *Le Clerk* 422
Bands. *Verdun* 451
Bleeding in the Foot. By *St. Hilaire* 480
Bleeding in the Arm 353
Bones crooked. *Petit* 671
Bones luxated. *Vaugion* 660
Bones fractured. *Petit* 659
Bones diſlocated. *Wiſeman* 646
Bones luxated. *Le Clerk* 630
Bones luxated. *Fabritius ab Aquapendente* 534
Bones fractured. *Fabritius ab Aquapendente* 521
Bones to preſerve their Tone and Subſtance. *Fabritius ab Aquapendente* 526
Bones Chirurgical Operations. *Fabritius ab Aquapendente* 414
Bones cleanſed. *Lyſerus* 339
Bones Compoſition 445
Bones boiled 333
Bones to whiten 332
Bones petrified 334
Bones. *Gagliard* 295
Bones, their Origine. *Coiterus* 258
Bones. *Kehl* 208
Bones of the Feet. *Vaugion* 665
Bones. *Le Clerk* 78
Bones, their Recapitulation 134
Bones, their Nature. *Spigelius* 36
Bones in general. *St. Hilaire* 53
Breaſt-Bone. By *Le Clerk* 473
Breaſt-Bone 220
Buttock Ulcer. *St. Hilaire* 479

VOL. II.

Bladder 20, 515
Bliſters 367
Bloody Urine 565
Brain, its Hiſtory 639
Brain diſſected. 644
Bronchotomy, its Operation 621
Bubo 374
Burns from Gunpowder 320

VOL. III.

Blood, what it is 1, 19, 35
--- Its Motion, and Derivation 1, 2, 7, *&c.* 45
--- Of what it conſiſts 3
--- Its Colour 3, 4, 19, 50
--- Its Principles and Elements 45
--- Its Diſaffection 5 to 7
--- Its Nature and Uſe 14, 15
--- Its Particles 22, 49
--- Signs of good and bad Blood 53, 54
--- Its Circulation 62, 240
--- How much there is in the Body 190
--- Its Velocity 195
Bubo 597
Bubonocele, an extraordinary Caſe of one 446
Burns, their Remedies 647

C.

VOL. I.

CAllus in Fractures. By *Fabritius ab Aquapendente* Page 528
Canulæ. *Dion* 433
Caries through the Skull, *&c. Wiſeman* 599
Carpus. *Le Clerk* 121
Cartilages in general *St. Hilaire* 72
Cartilages. *Spigelius* 194
Cartilages. *Havers* 740
Cartilago Mucronata 662
Cheſt or Thorax. *Spigelius* 22
Clavicles. *St. Hilaire* 68
Clavicles. *Le Clerk* 114
Clavicles. *Spigelius* 158
Clavicles. *Charriere* 221
Clavicles. *Kerkering* 287

Cla-

Clavicles. *Gagliard.* Page 297
Clavicles. *St. Hilaire* 472
Clavicles. *Vaugion* 653
Clavicles. *Petit* 661
Cliquetis of the Bones. *Le Clerk* 629
Coccygis Os. *Spigelius* 167
Coccygis Os. *Coiterus* 263
Coccyx fractured 473
Compoſition of the Bones. *Gagliard* 296
Compoſition of the Bones *Lyſerus* 339
Compoſition of the Laminæ of Bones. *Havers* 638
Compreſſes. *Dion* 437
Concuſſion, with a fractured Leg. *Wiſeman* 596
Concuſſions and Contuſions 602
Connexion of the Bones 43
Contuſions of the Skull, with Fractures. *Wiſeman* 589
Coronale 80
Cranium. *Spigelius* 143
Cranium or Skull 59
Crookedneſs of the Bones in Rickets. *Petit* 671
Cubiforme 131
Cubiti Os. *Le Clerk* 120
Cuneiforme. *Spigelius* 149
Cuneiforme, 1, 2, 3, 132

VOL. II.

Cachexy 549
Cæſarean Section 509 to 516
Cancer 469
--- Operation 472
Cancer of the Breaſt 475
Cancers. From *Beckett* 479
Cataract of the Eye 157, *&c.*
Cataract, its Cauſes 161
Cataract, Difference 162
Cataract, Signs Diagnoſtick 163
Cataract, Signs Prognoſtick 164
Cataract, if cur'd by Medicine 167
Cataract Couch'd 168
Cataract Milky 170
Cataract Cheeſy, *&c.* 172
Cataract Black 175
Cataract Falſe 177
--- Shaking 180
--- Mix'd 183
Cauteries 363
Cerebel 642
Cerebrum Diſſected 33, 34, 35
Cholera Morbus Page 530
--- Cured 536
Circle of the Eye 156
Cæliack Paſſion 531
Colick, and Cure 531 and 542
Conſumption, and its Cure 631, 636
Convulſion 665
--- Cured 686
Cornea of the Eye 153
--- Its Diſeaſes 196
--- Abſceſs 199
--- Puſtules 198
--- Ulcers 201
--- Fiſtula 202
Corpus alloſum 641
Corns 385
Cough, and its Cure 637
Cranium Diſſected 31
Cryſtalline of the Eye 155
--- Protuberance 178
--- Abſceſs 182
--- Diſplaced 185
--- Spotted 186
Cupping 365
Cuticula manag'd 6
Cuticula, what 62
Cutis 63

VOL. III.

Cancers of the Womb, and their Cure 477
Caſtration 445
Chancre 595
Chyle 6
Chylification 75, 107
Chyme 36
Concoction, and its Cauſes 157
Cortex 566
Contuſion, its Remedies 630

D.

VOL. I.

Differences of the Bones Page 38
Differences of the Cartilages 181
Difference of the Ligaments 193
Diſlocation of the Vertebræ. *St. Hilaire* 475
Diſlocation of the Elbow. *Le Clerk* 487
Diſlocation of the Wriſt. *Le Clerk* 489
Diſtempers in general. *St. Hilaire* 398
Diſtinction of the Bones 47

Dreſſing after Amputation. *Le Clerk* Page 491
Dreſſing after Delivery 478
Dreſſing after Stone. *St. Hilaire* 480
Dreſſings irregular 479

VOL. II.

Delirium 671
Diabetes 565, 566, 567, 569
Diaphragm 26
Diarrhœa 531
- - - Cured 536
Diſſections General 4
Dropſy 550
- - - Its Cure 553
Dyſentery 531
- - - Cured 537
Dyſury, and its Cure 564, 569

VOL. III.

Deſcent of the Womb, and its Cure 479
Digeſtion 107
Diſeaſes incident to Women and Children 474
Diſeaſes incident to Women with Child, and their Cure 489
Diſeaſes of Children, and their Cure 499
Diſeaſes of the Privy-Parts, and their Cure 436
Dropſy 354
Dropſy of the Womb, and its Cure 479

E.

VOL. I.

EAR. By *Spigelius* Page 15
Ear-Ulcer. *St. Hilaire* 479
Echymoſis. *Dion* 586
Emplaſters. *Dion* 435
Empyema 475
Exoſtoſis. *Wiſeman* 608
Exoſtoſis. *Le Clerk* 618
Eye. *Spigelius* 15

VOL. II.

Ear diſſected 40
Ear deſcrib'd 207
- - - The Auricle 209
- - - the Tympanum 211
- - - The Labyrinth 213
Ear, Uſe of the Parts 221
- - - Its Diſeaſes Page 232
- - - Cured 287
Ecchymoſis 378
Emphyſemis 385
Empyema 628
Epilepſy, and its Cure 666, 685
Epinyctides 384
Eryſipelas 378, 389
Eſſera 384
Eye deſcrib'd, and its Parts 151
Eye, its Diſeaſes 157
- - - Atrophy 192
- - - Synchyſis 193
- - - Rhexis *Ibid.*
- - - Falling out 194
- - - Wounds, *&c.* 195
Eye-Lids, Laſhes, *&c.* their Cures. From *Dion* 280
Exomphalos 517

VOL. III.

Excreſcence which ſuddenly grew out of a Woman's Groin 629

F.

VOL. I.

FEET. *Spigelius* Page 27
Feet contorted and miſhaped. *Dion* 582
Femoris Os. 176
Femoris Os of a Fœtus. *Coiterus* 265
Fibula. *Coiterus* *Ibid.*
Figures repreſenting ſeveral Fœtus's 271
Figures explained concerning the Oſteology of the Fœtus 291
Figures of ſeveral Bones. *Gagliard, &c.* 317
Figures of the Bones. *Dion, St. Hilaire, &c.* 182
Figures relating to Amputation. *Verdun* 495
Finger Bones. *Le Clerk* 122
Finger Stump. *St. Hilaire* 479
Fingers. *St. Hilaire* 474
Fiſſure in the Skull. *Wiſeman* 598
Fiſſure by Contuſion. *Wiſeman* 600
Fiſtula in Ano. *St. Hilaire* 476
Fœtus humane. *Kerkering* 267
Fœtus of 15 Days old. By *Kerkering* 268
Fœtus of 3 Weeks *Ibid.*
Fœtus of a Month *Ibid.*

INDEX.

Fœtus of 6 Weeks old *Page* 269
Foot Bones. *Le Clerk* 132
Foot Bones. *Spigelius* 179
Foot Bone. *Charriere* 224
Fractures. *Le Clerk* 453
Fractures. *Vaugion* 652
Fractures. *Fabritius ab Aquapendente* 521
Fracture complicate. *Petit* 660
Fracture complicate. *Le Clerk* 482
Fractures, Remarks of. *Dion* 469
Fractures their Symptons 529
Fractures, to prevent Inflammations 522
Fractures of the Skull. *Dion* 558
Fracture of the Skull not to reach the *Dura Mater* 550
Fracture of the Skull penetrating the *Dura Mater*. *Fabritius ab Aquapendente* 552
Fractures and Contusions of the Skull explained by Figures. *Dion* 557
Fracture with a Fissure and Depression of the Skull. *Wiseman* 598
Fractures of the Skull, and their several Instruments. *Scultetus* 629
Fracture of the Nose. *St. Hilaire* 471
Fracture of the Thigh. *Ryley* 657
Fracture, an uncommon. Abstracted from *D. Turner* 573
Fracture, Figure of. Explained by *Turner* 573
Fractur'd Bones dress'd. *Le Clerk* 473
Fractures transvers'd with a Wound 523
Fractures with Wounds, their Cure 530
Furniture after Fractures. *Le Clerk* 461

VOL. II.

Fibres 394
Ficus 384
Fistula Lachrymalis 465
Fistula in the Breast 628
Fontanels 363
Furuncle 377

VOL. III.

Fœtus of 21 Months old 517
- - - Its Generation, Formation, Nutrition, and Birth 347 to 354
- - - Its Posture in the Womb 337
- - - The Membranes that involve it *Ibid.*
Febris Miliaris Compositа 174
- - - Diseases which succeed *Ibid.*
Febris Miliaris, its Causes, Symptons, and Cure *Page* 168 to 174
Fermentation 67
Ferment of the Pancreas 101
- - - Of the Spleen *Ibid.*
Fevers in general 516 to 560
- - - Acute and Intermittent 560
Fibres of the Heart, how contracted 120
Fistula in Ano 458
Fistula in Ano, its Instruments 468
Fistula's of the Womb, and their Cure 477
Fluids, of their Nature 157
Fluidity, the Nature of it 12
Fractures, their Remedies 640
Fundament, how to reduce it 443
Furor Uterinus, its Cure 487

G.

VOL. I.

GEneration, Parts of *Page* 24
Generation of the Bones. By *Havers* 689
Generation of the Mucilage *Havers* 737
Gums diseased. *Dion* 390
Gums Operation 392
Gums rotten. *Musitanus* 677
Gums to cure 680

VOL. II.

Gall-Bladder 509
Genital Parts 22, 25
Glands in general 431
Glands of the Mesentery *Ibid.*
- - - Of the Omentum 433
- - - Of the Pancreas 434
- - - Of the Spleen 435
- - - Of the Liver 436
- - - Of the Kidneys, &c. 437
Gland Thymus 438
- - - Of the Gullet *Ibid.*
- - - Of the Thyroide 439
Glands Parotid 440
- - - Maxillary 441
- - - Of the Head 443
- - - Of the Eyes 445
- - - Axillary *Ibid.*
- - - Of Generation 447
- - - Of the Penis 449

Glands

Glands of Female Generation *Page* 450
- - - Of the Breaſt, *&c.* 452
Glaucoma 177, 183
Gutta Serena 190

VOL. III.

Gangreens of the Womb, and their Cure 477
Generation 342
Generation, Parts of 322
- - - Their Diſeaſes and Cure 325, 360
Gonorrhæa 580
- - - Its Cure 484, 485, 599
Greenſickneſs, its Cure 486

H.

VOL. I.

HAnd Bones *Page* 72
Hand Bones. *Spigelius* 174
Hand Bones. *Le Clerk* 121
Hand Bones. By *Charriere* 222
Hand Ligaments 198
Hair Lip. *Le Clerk* 488
Head Bones. *Coiterus* 260
Head Bones. *Le Clerk* 78
Head Bones. *Spigelius* 174
Head Bones. *Dion* 374
Head Bones of an Infant. *Eyſſon* 232
Head Bones, all explained by Cuts, in two Plates, conſiſting of 14 Figures 137
Head Wounds. *St. Hilaire* 579
Head Cartilages. *Dion* 193
Hernia or Rupture. *Hilaire* 476
Humeri Os. *Gagliard* 315
Humeri Os. *Le Clerk* 117
Humeri Os. *Spigelius* 172

VOL. II.

Hare Lip 293
Head 29, 31
- - - Its Containing Parts 649
- - - Diſeaſes and Cures 660
Hæmoptoſis 637
Hæmorrhoids 532
Heart 600
Heart, unuſual Palpitation, ſo as to break the Ribs 266
- - - Its Motion 606
- - - Ferment and Texture 615
- - - Contracting Fibres 618
Hernia of the Navel, *&c.* *Page* 517
Hernia of the Belly 520
Hernia cured 521
Hernia Inteſtinalis 534
Herpes 378
Herpes Exedens 329
Hydroa 384
Hydrocephalum 678
Hydromphalos 517
Hydrophobia, and its Cure. 674, 681

VOL. III.

Hæmorrhoids of the Womb, and their Cure 475
Heart 25
- - - Its Pulſation and Palpitation 123
- - - Its Motion 25, 44
Harvey's Opinion of the Heart 40 to 44
Hyſterick Fits, and their Cure 482
Hydatides 623
Hypopyon, a remarkable Caſe 628

I.

VOL. I.

JAW-Bone Fracture. By *St. Hilaire* *Page* 472
Jaw-Bone Upper. *Kiel* 213
Jaw-Bone Lower 214
Jaw-Bone Upper of a Fœtus 473
Jaw-Bone Lower. *Kerkering* 280
Ilii Os. *Coiterus* 265
Ilium. *Hilaire* 473
Infant Oſteologia. *Eyſſon* 227
Inferior Limbs. *Kerkering* 289
Innominata Oſſa 219
Innominatum Os Fœtus 284
Inſtruments for the Teeth 393
Inſtruments for Fractures. *Scultetus, &c.* 629
Inſtruments of Chirurgery. *Dion* 424
Interior Structure of the Bones. *Gagliard* 295
Jugale Os. *Spigelius* 152
Jugular Vein to cut. *Dion* 377

VOL. II.

Iliack Paſſion, and Cure 532, 542
Impetigo 380
Inteſtines 11
Inteſtines. *Verheyen* 499
- - - Their Diſeaſes 528

Iſchury,

Iſchury, and its Cure *Page* 564, 569
Iſſues 363
Itch 380

VOL. III.

Inflation of the Womb, and its Cure, 478
Inflammation of the Womb, and its Cure *Ibid.*

K.

VOL. I.

KNEE diſlocated. *Hilaire* *Page* 481

VOL. II.

Kidneys prepared 20
Kidneys deſcrib'd, *&c.* 513
- - - Their Diſeaſes 560
King's Evil, *&c.* 454
- - - Cured 458
King *William*'s Caſe 577

L.

VOL. I.

LAmels, Obſervation I. By *Gagliard* Page 297
Lamels diſpoſed, Obſ. III. 299
Lamels corrugated, Obſ. V. 300
Lamels perforated *Ibid.*
Larynx. *Clerk* 104
Leg-Bones. *Spigelius* 178
Ligaments in general 74
Ligaments Nature and Uſe 195
Ligaments of the Head, Breaſt, and Belly 197
Ligaments of the Limbs and Hand 198
Ligaments of the Leg 199
Lithotomy 563
Lower Venter 23
Luxation, from *Fabritius ab Aquapendente* in general 534
Luxations in general cured 536
Luxations of the Maxilla 538
Luxation of the Humerus 540
Luxation of the Elbow 544
Luxation of the Radius *Ibid.*
Luxation of the Metacarpus 545
Luxation of the Femur 546
Luxation of the Knee *Page* 548
Luxation of the Talus, and of the Toe. From the ſame Author 549
Luxations. *Le Clerk* 630
Luxation of the Wriſt 635
Luxation of the Knee-Pan 636
Luxation of the Foot *Ibid.*
Luxation of the Jaw 637
Luxation of the Patella. By *J. Ryley* 857
Luxations of the Bones of the Cranium. By *Vaugion* 660
Luxation of the Noſe *Ibid.*
Luxation of the lower Jaw-Bone 61
Luxation of the Clavicle 661
Luxation of the Vertebræ *Ibid.*
Luxation of the Ribs, and the Cartilago Mucronata 662
Luxation of the Humerus *Ibid.*
Luxation of the Elbow 663
Luxation of the Wriſt 664
Luxation of the Thigh *Ibid.*
Luxation of the Knee 665
Luxation of the Bones of the Feet *Ibid.*
Luxation Machines, *&c.* By *Petit* 666

VOL. II.

Lacteal Veins 15
Lacteals 431, 500
Leaches 367
Leproſy 380
Lethargy, and its Cure 664, 681
Leucoma 204
Liver 17, 509
- - - Its Diſeaſes 547
- - - Cure 551
Lungs 603
Lyentery 531
Lymphaticks 500
Lymphæducts 431, 335

VOL. III.

Leaſting, how that Action is performed 128
Letter concerning a Secretion of the Peritonæum, and Muſcles of the Abdomen 621
Lithotomy 449
Lympha 55, 56
Luxations, their Remedies 640

M.

VOL. I.

MArrow of the Bones. From *Havers* *Page* 684
Marrow 717
Maxilla three different Ways 77
Maxilla ſuperior 97
Maxilla inferior 99
Maxilla inferior and ſuperior. By *Spigelius* 152
Meditullium. Framed from *Gagliard* 302
Membranes of the Fœtus. From *Kerkering* 273
Metacarpus Bones 121
Metacarpus fractured 473
Metacarpus luxated 544
Metatarſus Bones 132
Mucilaginous Glands 731
Mucilage 739

VOL. II.

Madneſs 673
- - - Its Cure 680
Mediaſtinum, and its Veſſels 597, 599
- - - Its Diſeaſes 627
- - - Its Cures From 628 to 630
Medulla Oblongata 643
Melancholy 672
- - - Its Cure 680
Meliceris 385
- - - Obſervations 461
Members 393
Membrana Adipoſa, Carnoſa, &c. 66
Meſentery 11, 502
- - - Its Diſeaſes 545
Muſcles, their Diſeaſes and Cures 275
Muſcles of the Tongue and Uvula cured 289
Muſcles of the Abdomen 8, 82
- - - Of the Anus, &c. 18, 78, 90
- - - Of the Breaſt 25, 77, 103
- - - Of the Larynx 29, 76, 99
- - - Of the Face 30, 74, 94
- - - Of the Shoulders, *&c.* 44, 106
- - - Of the Arm, *&c.* 47, 48, 49
- - - Of the Hand 51, 115
- - - Of the Head 52, 107
- - - Of the Thigh and Leg 56, 57, 122, 126
- - - Of the Foot 61, 129
Muſcles in general 67
Muſcles, their Names *Page* 81
Muſcles of the Teſticles 88
- - - Of the Yard *Ibid.*
- - - Of the Urinary Bladder 89
- - - Of the Eye and Lids 91, 92, 152
- - - Of the Ear 95, 96
Muſcles deſcrib'd 134
Muſcles of the Larynx and Uvula, new Deſcription 225
- - - Obſervations. From *Steno* 238
- - - Their Motion. From *Mayow* 269
Myology, or Doctrine of the Muſcles 137

VOL. III.

Mad-Dog, its Bite 273
Membranes 201
Menſes 339
Mercury 578
Mercurial Medicines, their Operations 236
Motion voluntary 131
Muſcles of the Abdomen 202
- - - Of the Back 85, 199
- - - In general 196
- - - Their Names 202
- - - Of the Teſticles *Ibid.*
- - - Of the Yard *Ibid.*
- - - Their Motion, from *Mayow*'s Different Opinions of Authors concerning their Contraction 83, 121
Muſcular Motion 196
Myology 210

N.

VOL. I.

NAils Chirurgical Operations 396
Nature of the Bones 37
Navicolare Os. By *Le Clerk* 131
Noſe 15
Noſe Bones 95
Noſe fractured. *Le Clerk* 482
Noſe luxated 661
Nutrition of the Bones. By *Lemery* 681

VOL. II.

Nerves 394

VOL. III.

Non-natural 254
Nutrition 140

INDEX.

O.

VOL. II.

OCcipitis Os. *Kerkering* Page 275
Occipitis Os. *Le Clerk* 84
Omoplata. *Spig.* 69
Omoplatæ. *Clerk* 115
Omaplata. *Hilaire* 472
Operations Chirurgical in General. From *Dion* 409
Operations of the Bones. From *Fabr. ab Aquapendente* 414
Operations, from *Dion* of Amputation 503
Origine of the Bones. From *Coiterus* 258
Ovum human. Fœtus. *Kerker.* 267

VOL. II.

Oedema 390
Oedematous Tumours 379
Oeſopagus 496
Omentum 10, 495
Ophthalmia 157, *&c.*
Ophthalmia Strumoſa 465
Optick Nerve 154
--- Its Diſeaſes 190
Ozæna 674

VOL. III.

Operation of the Bladder 605
Organs of Generation in Women 328
Ove of the Women 342

P.

VOL. I.

PAins of the Bone. By *Le Clerk* 612
Palate Bone 98
Palate Chirurgical Operations 394
Panaritium *Ibid.*
Patella luxated 657
Penis 316
Penis Dreſſing 476
Perioſteum. *Havers* 691
Perone 129
Phlebotomy 353
Phlebotomy Inſtruments 421
Pledgets Page 433
Preſervation of Bones 245
Proportion of the lower Belly 34
Pubis Os 124
Pudenda 34

VOL. II.

Palpitation of the Heart, *&c.* 629
Palſey, *&c.* 670
--- Its Cure 684
Pancreas 16, 506
Paraplegia, and its Cure 670, 684
Pericardium, *&c.* 601
---Its Diſeaſes and Cures, from 627 to 630
Peripneumonia. from 627 to 630
Peritonæum. *Lyſerus* 10
Peritonæum. *Verheyen* 494
Phlegmon 371
Phlyctenes 384
Phrenzy, and its Cure. 672, 679
Phthiſick, and it Cures 631, 636
Phygeton 377
Phymoſis *Ibid.*
Phyſadracia 384
Pleura 599
--- Its Diſeaſes and Cures. 627, 628, 629, 630
Pleuriſy 229
Pneumatomphalos 517
Polypus in the Heart 595
Polypus in the Noſe. 674
Pterygion 204

VOL. III.

Pains of the Womb 480
Paraphymoſis 448
Penis 316
Phymoſis 447
Placenta 336, 356
Poiſons 258
Poiſonous Creatures 265
--- Minerals and Plants 275
Phlyctæna 624

Q.

VOL. II.

QUinſey Page 621
--- Its Cure 624

INDEX.

R.

VOL. I.

Reticular Scales. By *Gagliard* Page 301
Ribs Conformation. *Gagl.* 307
Ribs 67
Ribs 112
Ribs. From *Spigelius* 168
Ribs. From *Keil* 219
Ribs. From *Coiterus* 263
Ribs. From *Kerkering* 285
Ribs. From *St. Hilaire* 472
Ribs. *Le Clerk* 474
Ribs fractured. *Vaugion* 654
Ribs Luxated 662
Rickets. By *Le Clerk* 622
Rickets. By *Petit* 669
Rickets explained 672
Rickets, their Signs 673
Rotula. *Clerk* 127
Rotula. *Spigelius* 176

VOL. II.

Respiration from 607 to 614
Retina of the Eye 154
--- Its Diseases 189

VOL. III.

Ragades of the Womb, and their Cures 476
Rules for the Practice of Physick. By Sir *David Hamilton* 165
Ruptures of the Uterus, a strange one 504

S.

Sacrum. *Dion* 11
Sacrum. *Spigelius* 166
Sacrum. *Coiterus* 263
Scapulæ. *Keil* 221
Scarpulæ. From *Kerkering* 287
Sesamoidea Ossa 133
Sesamoide. *Spigelius* 174
Sesamoidea. *Coiterus* 266
Shoulder-Bone fracturated. From *Vaugion* 656
Size of the Body 29
Skeletons and their Parts 75
Skeleton of a Woman Page 76
Skeleton described. From *Le Clerk*'s Compleat Osteol. 319
Skeleton. From *Simon Pauli* 332
Skeleton of one crooked. *Clerk* 442
Skeletopœia explained 353
Softness of the Bones 620
Sphænoides Os 91
Sphænoides Os. *Kerkering* 279
Spine 61
Spine. *Spigelius* 166
Spine. *Keil* 221
Spine. *Kerkering* 282
Spine, its Motion. *Clerk* 626
Spine incurvated. *Clerk* 638
Sternum 113, 596
Sternum. *Spigelius* 162
Sternum. *Coiterus* 263
Sternum. *Kerkering* 286
Sternum managed for Skeleton 335
Sternum fractured. *Hilaire* 472
Sternum fractured. *Vaugion* 655
Stinking Teeth. *Petit. Musitanus* 679
Stone cut. *St. Hiliare* 478
Stone extracted, &c. 450
Superficies of the Bones. *Havers* 700
Superior Limbs 288
Suture and stitching of a Tendon. *Le Clerk* 626
Sutures of the Head. From *Coiterus* 260
Syncipitis Os. *Kerkering* 275

S.

VOL. II.

Samaritan Balsam 311
Sarcomphalos 517
Scirrhus 469
Scirrhus Tumours 379
Scurvy 391
Serpigo 378
Seton apply'd 356
Small Pox 65
Spermatick Vessels 19
Spitting of Blood 637
--- Its Cure 638
Spleen 16, 507
--- Its Diseases and Cures 557
Squint Eyes 205
Steatoma 385
Sternum 596

Stomach Page 11, 496
--- Its Diſeaſes and Cures 523
Stone 56
Strangury, and its Cure 564, 569
Struma, Obſervations 460
--- Suppurated, *&c.* 461
--- Extirpated 462
Strumous Ulcers. *Ibid.*
Strumous Ulcers with Caries 463
Suture of the Tendon 351
Syncope 629

VOL. III.

Salivation 585
Sanguification 35
Scirrhus of the Womb, and its Cure 479
Seminal Veſſels 313
Serum 55
Spermatick Veſſels 19, 311
--- Arteries 311
Spleen, its Uſe 101
--- Its Action, and Uſes 145
Stone, how to be cut 605
Suppreſſion of the Terms, and its Cure 480
Suppreſſion of Urine. Mrs. *Jeſſop*'s Caſe, its Cure 620
--- The Caſe of a Maid of 18 Years of Age 621

T.

VOL. I.

TAble, explaining the Figures of *Dion* 449
Talus luxated. From *Fabr. ab Aquapendente* Page 549
Teeth 61
Teeth. *Le Clerk* 100
Teeth. *Spigelius* 155
Teeth. *Charriere* 201
Teeth. *Lanzon* 205
Teeth. *Keil.* 215
Teeth. *Coiterus* 262
Teeth. *Kerkering* 281
Teeth. *Gagliard* 306
Teeth Diſeaſes 382
Teeth Operation 383
Teeth Diſeaſes. *Petit* 674
Teeth looſe. *Muſitanus* 610
Temporum Oſſa. *Kerker.* 276
Tents. From *Dion* 424
Thighs. *Keil* Page 424
Thigh fractured. *Vaugion* 657
Thigh fractured. *G. Ryley* *Ibid.*
Thigh luxated. *Vaugion* 664
Tibia. *Clerk* 127
Tibia. *Coiterus* 265
Tranſfuſion of Blood 379
Trepan of the Skull. From *Dion* 568
Trepan dreſſed 570
Trepan. By *Belloſt* 588
Trepanning after Directions. By *Le Clerk* 481

VOL. II.

Teneſmus, and its Cure 531, 538
Thoracick Duct 504
Thorax 24, 25, 27, 28, 597
--- Its Diſeaſes 620
--- Cure 626
Thymus Gland 438, 599
--- Its Diſeaſes and Cures from 627 to 630
Trachea 605
--- Its Diſeaſes 621
Tumours in general 369
Tumour Enkyſted 361
--- Enkyſted Baſtard 390
Tumours, their Obſervations. From Mr. *Le Clerk* 386
Tumours of the Belly and Navel 517

VOL. III.

Tarantula, its Bite 267
Teſtes, their Uſes 250
Teſticles 312
Tumefied Teſtes, a remarkable Caſe 619
Tumours, their Remedies 633

V.

VOL. I.

Vertebræ. *Spigelius* 163
Vertebræ. *Coiterus* 262
Vertebræ. *Kerker.* 282
Vertebræ fractured. From St. *Hilaire* 472
Vertebræ fractured. *Clerk* 474
Vertebræ fractured. *Vaug.* 654
Vertebræ diſlocated. *Hilaire* 475
Vertebræ luxated. *Hilaire* 661
Ulcers with Caries 610
Vomer, or the Plough ſhare 96

INDEX.

VOL. II.

Varicomphalos *Page* 519
Varix 429
Veins 403
Veins. *Cowper* 414
Vertigo. 664
--- Its Cure 682
Vitreum of the Eye 154
--- Diſeas'd 187
--- From *Belloſte* 332
--- From *Wiſeman* 324
Ulcers in particular. 327, 328, 329, 330
Ulcer Eating or Phagedænick 327
--- Nomous 328
--- Herpes Exedens 329
--- Putrid and Sinuous *Ibid.*
Ulcers of the Stomach 526
Ulcers of the Kidneys 567
--- Of the Trachea and Gullet 624
--- Of the Lungs, and their Cures 631
636
Vomiting 527
Ureters 20, 513
Uvea of the Eye 153
--- Its Diſeaſes 191
Uvula 29, 76, 99, 224
--- Its Diſeaſes 289

VOL. III.

Varices, an extraordinary Caſe 625
Venereal Diſeaſes 57
Verrucæ, or Warts, 630
--- Its Cure 589
Viper, its Bite 260
Umbilical Abſceſs, an extraordinary Caſe 442
Ulcers of the Womb, and their Cure 476
Ulcers, their Remedies 646
Umbilical Veſſels 336, 348
Vomiting 229

W.

VOL I.

WOunds of the Brain 606
Wriſt luxated 636
Wriſt diſlocated 489

VOL. II.

Warts *Page* 385
Worms in the Guts, and their Cure. 539
Wounds in General 295
--- In the Limbs 301
Wounds. From *Vaugion* 303
--- From *Belloſte* 306
Gun-ſhot Wounds 317
Wounds Gun-ſhot dreſs'd 334
--- In the Muſculus Biceps 339
--- By Musket-Ball in the Thigh 340
--- Of the Nerves 416
--- Of the Veins and Arteries 419
--- Of the Trachea and Gullet 624
--- Of the Lungs 631

VOL. III.

Weakneſs of the Womb, and its Cure 479
Whites, and their Cure 484
Womb 206
--- How to reduce it 443
Women their Delivery 375
Wound, an extraordinary Caſe of extracting an extraneous Body out of it 625
Wounds, their Remedies 641

Y.

VOL. II.

YEllow Jaundice 548
--- Its Cure 552

Z.

VOL. I.

ZYgoma, or Os Mali 96

MVSEVM BRITANNICVM

An

An Account *of this Book intitled,* Britannia & Hibernia Antiqua & Nova, *to be publiſhed Monthly, with about* 200 *new Maps, Cuts, Tables,* &c. *'till the whole is compleated, and may be bound up with exact Indexes,* &c.

I. IN order to make this Work as complete, as the Nature of the Thing will bear, Care has been taken to conſult all Sorts of Authors, Ancient and Modern, that might any way conduce to ſuch a Deſign. Particularly it will receive great Advantage from *Leland*'s Itinerary, *&c.*

II. The *Introduction*, Part of which is here printed, and gives a ſuccinct Account of the ancient State of *Britain*: As, Of *Great Britain* in general; of the firſt Inhabitants of *Britain*; of the Name *Britain*, and of that of *Albion*; of the Cuſtoms, Manners, and Way of Living among the ancient *Britains*; of the Conqueſts of the *Romans* in *Britain*; of the Converſion of the *Britains* to Chriſtianity; of the *Saxons*; of the Converſion of the *Saxons*; of the *Engliſh-Saxon* Names; of the *Danes*; of the *Normans*; and, of the various Diviſions that have been made of *Britain* in all Ages.

III. The Shires will follow in Order of the Alphabet: And of theſe the Reader may expect the beſt Deſcription that can be gather'd, either from printed Authors, or ſuch Manuſcripts as have fallen into our Hands; either from the Accounts already ſent in, or from the Information that may hereafter be received. Particularly in the Counties will be inſerted,

IV. 1. *Eccleſiaſtical Hiſtory*: As, The Foundation of Churches and Monaſteries, eſpecially Cathedral Churches; together with a Hiſtory of Biſhops and Councils to this preſent Time.

V. 2. *Civil Hiſtory*: As, The Building of Cities and Towns; an Account of all the Battels that have been fought in this Iſland, *&c.* To which will be added, as we come to the Places from whence they have their Titles, a Hiſtory of the Nobility down to our own Times.

VI. 3. *Natural Hiſtory*: As far as it can be learned, either from Authors that have wrote in general upon this Subject, or from the Philoſophical Tranſactions, or from ſuch as have made it their Buſineſs to give us the Natural Hiſtory of particular Counties. Here Notice will be taken of ſuch Plants and Animals, as appear to be uncommon; of Minerals, Mineral Waters, *&c.* from the beſt Writers.

VII. 4. *Literary Hiſtory*: As the Birth-places of learned Men, particularly noted Writers.

VIII. 5. *Antiquities*: Whether they be *Roman*, *Saxon*, or *Daniſh*. Here we will mention ſuch Inſcriptions as ſeem to be of Value; and give ſome Account of High-Ways, Camps, Buildings, Moſaic-Works, Coins, and Inſtruments both Religious and Military, as often as we meet with them at the Places where they have either heretofore or lately been diſcovered.

IX. 6. At the End of every County will be added a Table, ſhewing, at Sight, the Diſtance of Market-Towns and other remarkable Places, not only from one another, but from *London*. After this ſhall follow an Alphabetical Catalogue of all the Places in every Shire, deſcribed or not deſcribed, telling, at one View, in what Hundred or Deanery they lie, how they are valued in the Queen's-Book, who are the Patrons and preſent Incumbents, as far as it can be known; and in the laſt Column may be ſeen the Seats of the Nobility and Gentry; which all Gentlemen, *&c.* that are willing to encourage this Work, are deſired to inſert in the proper Columns in the foregoing Table, and ſend them to *John Nutt*, Printer in the *Savoy*, Poſt paid.

X. Beſides what is already mentioned, there will be an Account of Rivers; how far they are navigable, what Trade is managed upon them, with ſeveral other Miſcellaneous Things, which cannot eaſily be reduced to any proper Head.

N. B. There will be not only a particular Map of every Shire, beſides ſome general ones in the Introduction, but ſeveral other Cuts, curiouſly engraved, which as they

they will be an Ornament to the Work, ſo will they illuſtrate ſeveral Things, we ſhall have Occaſion to ſpeak of, better than any Deſcription that can be given of them.

We doubt not but a Work of this Kind will be acceptable to the Reader. It is therefore earneſtly deſired, that thoſe Perſons, who are willing to encourage this Undertaking, would ſpeedily ſend in ſuch Informations as they think material, and may be of Uſe towards the completing this Deſign, in any, or every Branch of it. The Method we have purſued, and the Manner of publiſhing this Britannia, *will give them an Opportunity of knowing, whether what they ſhall think fit to communicate, can be received early enough to be made uſe of. And here we promiſe, to own our Obligations publickly to any Perſon, that ſhall do us the Favour of furniſhing us with Materials. This we ſhall do by mentioning his Name, if it does not appear to us, he is unwilling we ſhould make uſe of ſuch a Liberty.*

Preparing to be printed in the CAMBRIDGE *Preſs*;

1. EUſebii, *Socratis, Zozomen. Theodoret.* &c. *Hiſtoria Eccleſiaſtica*, in 3 Vol. Gr. & Lat. Printed from the fine *Paris* Edition publiſhed by *Valeſius*. In this Edition his Notes are all put entire at the Bottom of each Page, and under them the *Variorum* of others, as Biſhops *Uſher, Pearſon, Beveridge*, &c. Dr. *Cave, Du Pin*, and many others that writ ſince *Valeſius* publiſhed his Edition. This contains one Fifth more than the *Paris* Edition, and much more correct; with ſeveral new Maps, exactly referring to the Diſcourſe. Price to Subſcribers 3 Guineas in Quires, with Allowance; the Royal Paper 5 Guineas.

2. *Caſtalio*'s Latin Bible, in 3 neat Pocket Volumes, in 12°.

3. A curious Greek Teſtament for the uſe of Schools: And, 4. A Latin Teſtament for the ſame.

*** Newly publiſhed, The preſent State of *Great Britain* and *Ireland*. By *Guy Miege*. With the Liſt of all that are in Office as they are now, and three Maps, *viz. South Britain, North Britain*, and *Ireland*, by *H. Moll*. In 8vo. Pr. 5 *s*.

A compleat Hiſtory of *Europe* for 1712. Both printed for *J. Nicholſon* in *Little Britain*, and *A. Bell* in *Cornhill*; where may be had the compleat Hiſtory of *Europe* from 1600. in 17 Volumes. Pr. 5 *s*. each.

A Curious Edition of *Cluverii Geographia, cum Notis Variorum*, as *Buno, Hickelius, Riſkius*, &c. with the Addition of what is in *Cellarius, Baudrand, Luyts*, &c. in which is one Fourth more than in any former Edition, both as to Notes and Maps. Neatly printed in large Quarto. Pr. 15 *s*.

The Sybilline Oracles; tranſlated from the Greek of *Opſopius*, &c. by Sir *John Floyer* Kt. with Notes. Dedicated to the Lord Biſhop of *Litchfield*.

Bibliotheca Anatomica, Medica, Chirurgica, &c. in 3 large Vol. in Quarto, with near 1000 Figures, curiouſly engrav'd, and exact Indexes to the whole three Volumes. All printed for *J. Nicholſon* in *Little Britain*.

BOOKS in the Preſs;

Lucius Florus in *Engliſh* for the Uſe of Schools, with 120 Heads, all deſigned by *Grevius*. This is done from his fine Edition of the *Variorum*, with his Account of the Author, *&c.* in a neat Elzivir Letter. Pr. 2 *s*. 6 *d*. and will be publiſhed by *Lady-day* next.

— The ſame in *Latin* by *Minellius*, with all the Heads. Pr. 2 *s*. 6 *d*.

A Month after will be publiſhed *Suetonius*, from the curious Edition of *Petiſcus*, with many Cuts, in *Engliſh*.

The ſame in *Latin* in 12°. with all the Cuts.

By the firſt of *June* will be publiſhed, *Pancirollus*; of Things the *Romans* knew, and are now loſt to the Moderns, and what the Moderns have diſcover'd ſince; with *Salmuth*'s Notes. To this *Engliſh* Edition is added a large Chapter about Printing, and the firſt Diſcovery of it; with the *Bibliotheca Incunabula*, containing all that was printed abroad before 1500, and alſo what was printed in *England* before that Time. Alſo of the Invention of Gunpowder from Dr. *Sprat*, late Lord Biſhop of *Rocheſter*.

In all theſe will be an Eſſay towards a fine Tranſlation of *Livy*'s Hiſtory into *Engliſh*, from the *Variorum* and *Dauphin*'s Editions.

Alſo of *Pliny*'s Natural Hiſtory from *Hardwinus*, and the Dauphin's Editions. A Volume will conſtantly come out every Month from the 25th of *March* next, till the Claſſicks are gone thro', in the ſame Character and Paper; as alſo the Greek Hiſtorians.